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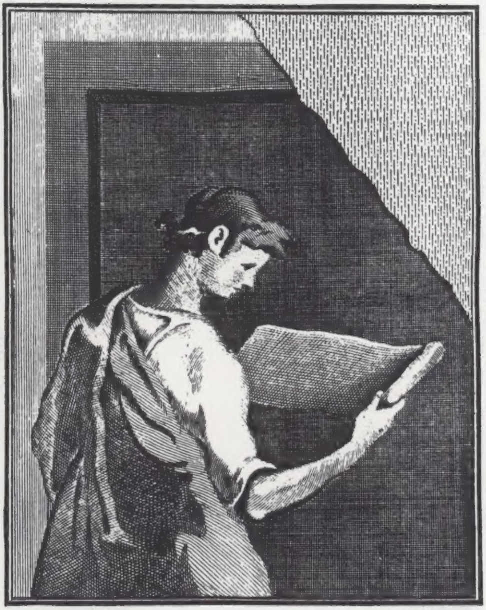

ILLUSTRATED

Annual Register

OF

RURAL AFFAIRS,

FOR

1873-4-5.

WITH 470 ENGRAVINGS.

VOL. VII.

ALBANY:

LUTHER TUCKER & SON.

1884.

LOSSING-BARRITT

RURAL AFFAIRS:

A PRACTICAL AND COPIOUSLY

ILLUSTRATED REGISTER

OF

RURAL ECONOMY AND RURAL TASTE,

INCLUDING

COUNTRY DWELLINGS, IMPROVING AND PLANTING GROUNDS,
FRUITS AND FLOWERS, DOMESTIC ANIMALS,

AND ALL

FARM AND GARDEN PROCESSES.

By J. J. THOMAS,

AUTHOR OF THE "AMERICAN FRUIT CULTURIST," AND "FARM IMPLEMENTS,"
ASSOCIATE EDITOR OF THE "CULTIVATOR & COUNTRY GENTLEMAN."

VOL. VII.

FOUR HUNDRED AND SEVENTY ENGRAVINGS.

ALBANY, N. Y.

LUTHER TUCKER & SON, 395 BROADWAY.

1884.

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BY JOHN J. THOMAS.

PUBLISHED BY LUTHER TUCKER & SON, ALBANY, N. Y.

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THE

ILLUSTRATED ANNUAL REGISTER

OF

RURAL AFFAIRS.

LAYING OUT HOME GROUNDS.

THERE ARE MANY FARMERS who desire to have their grounds about the dwelling laid out with some taste, but who cannot afford to keep up gravel walks, or to mow their lawns once a week. They would like a simple plan admitting the planting of shade trees, and the grazing of the grass by sheep or other animals, in lieu of mowing. Fig. 1 is intended to represent such a place, the entrance road having sufficient curve to remove all stiffness, and yet not so much as to give it a pretentious appearance. The common farm road lies on the left of these ornamental or shaded grounds, and both enter the yard devoted to the farm buildings at the rear.

A more finished plan is shown by fig. 2, where the carriage-way has

more curve, passes by the front entrance, and before entering the rear grounds, has a place for the turn of carriages. The lawn may be kept

Fig. 1.—*Simple Plan of Farm Grounds.*

mowed, or be grazed short, as the owner may prefer. If mowed, a considerable portion of the small shrubbery may be planted near the dwelling, as shown in the plan; but if grazed, none but very large shrubs or small trees should be admitted. In planting the trees the owner will, of course, vary the places of the groups or belts, so as to have the most pleasing distant views open, and exclude any object of an undesirable or unsightly character. The farm road may lie at either side of these grounds, and is not shown in the engraving.

When the extent of ground devoted to ornamental planting is more limited, and means and time are at command to give it a handsome finish, it may be laid out as represented in fig. 3. A neatly made carriage way passes to the front entrance, and to the yard in the rear, and also turns in front for return. The circular beds on the left are for bedding plants, such as verbenas, pelargoniums, salvias, &c., or they may be occupied with tulips and other bulbs, or with annuals or perennials. In the direction of the barnyard, fruit trees may be planted, which should be of such symmetrical kinds as the more regular-growing varieties of the cherry and pear, which will flourish better than most other fruit trees when growing in grass.

For a small village lot which is too narrow to admit any breadth of

lawn, and where a small grass plot is desirable, the plan shown in fig. 4 is particularly recommended. The dwelling is placed next the boundary, so as to give as much space as possible in the opposite direction. Beds for ornamental plants are in front of the bay window; large shrubs or small trees are placed as shown in the plan, but no large trees should be admitted.

GROUNDS FOR BARN, KITCHEN GARDEN, &C.

Fig. 2.—*Simple Grounds without Flower Garden.*

Towards the kitchen garden in the rear, a few of the more symmetrically-growing pear and cherry trees are planted. The walk is simple, but curved enough to remove all appearance of stiffness. In so small a plan everything should be kept in perfect neatness, as there is no excuse for neglect.

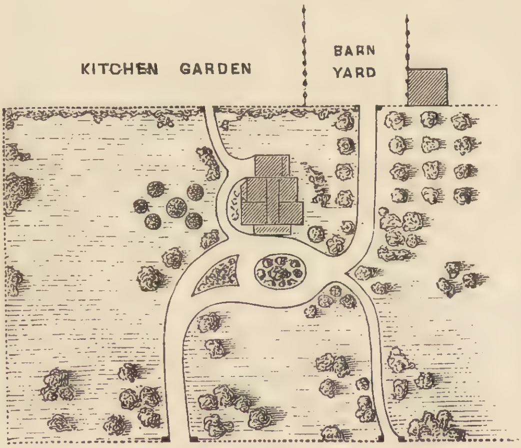


Fig. 3.—*Finished Grounds of Country Place.*

A large village lot, or a

small place in the country, may be laid out as in fig. 5, where the carriage road enters on the left, and the foot walk on the right. A group of circular flower beds fronts the bay window at the side, and a few are placed still farther off, on the opposite side of the walk.

Where the owner has a horse which he may employ in cultivating his garden, much labor will be saved by laying the ground out in lines running in one direction only, so that the horse may freely pass from one end to the other, leaving a grass strip vacant about 10 or 12 feet wide to turn upon, as in fig. 6. Rows of small dwarf apples, (worked on Paradise stock,) dwarf pears, raspberries, grapes, gooseberries, currants, &c., are placed at intervals of 12 feet or more, (15 or 20 feet would be better,) between which all the large vegetables are planted, so as to allow horse cultivation.

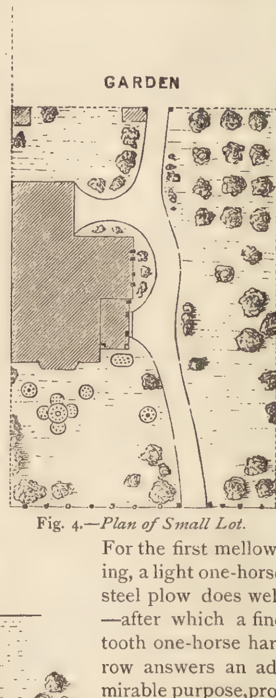


Fig. 4.—*Plan of Small Lot.*

For the first mellowing, a light one-horse steel plow does well—after which a fine tooth one-horse harrow answers an admirable purpose, provided it is passed so often as to keep the

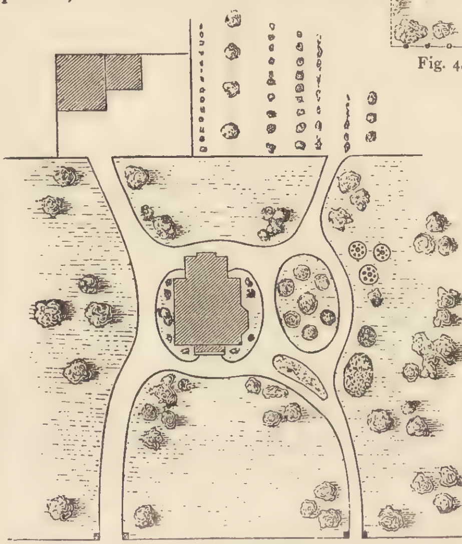


Fig. 5.—*Large Village Lot.*

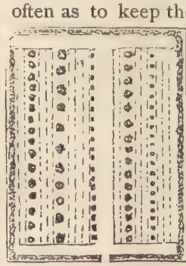


Fig. 6.

ground constantly clean and mellow, before the weeds can get their puny

heads above ground. When long neglected, and after the weeds have grown half a foot, it then becomes necessary to use the plow again ; and it is in consequence of this neglected management that horse cultivation is objected to, as making rough and imperfect work. Those portions of soil which lie in the rows, and which the harrow cannot reach, must, of course, be worked over with the common or pronged hoe. When onions, beets, &c., are sown in rows a foot or a foot and a half apart, a very narrow cultivator, or what is better, one with a tooth taken out, so as to go over a row and take two spaces at a time, is a great saver of labor. The man who does this horse cultivation must know how to do it neatly and carefully, and not be a bungler.

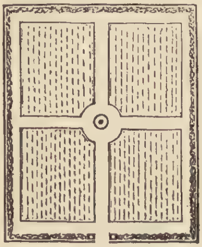


Fig. 7.

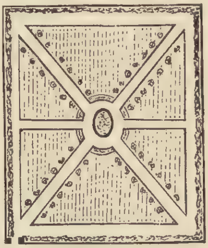


Fig. 8.

When all the heavy work is done by hand-spading, the garden may be laid out as in fig. 7, a dial or pillar for a flower-pot occupying the centre, from which alleys pass off in four directions to the alley which goes around the whole—currant bushes, grapes, &c., lining the fence or wall. A more ornamental form is shown in fig. 8, where a greater number of alleys radiate from the centre, which may be a handsome flower bed, with a few curved flower beds adjoining, the rest being fruits and vegetables. Where the garden is large enough, an additional alley may pass through the central parts lengthwise with the garden.

Fig. 9.

Flower Beds.—These sometimes have a rough and crude appearance, because they are not laid out and finished with care and precision. For general purposes we prefer the circle to all other forms of flower beds when

cut in grass. This is easily made of any desired dimensions, and by grouping the circles together, almost any required ornamental effect may be produced, (fig. 9.) In fig. 10 we have represented a symmetrical figure of seven circles, the larger in the centre, and arranged at equal distances from each other. This regular grouping is well adapted to any formal position in the grounds, near the dwelling, under a bay window, &c. The effect may be modified by taking only three contiguous circles in a triangle, three in a row, four in a rhomboidal position, or any other arrangement. Single circles may be scattered anywhere in the grounds, along the walk as may be desired, and can scarcely ever be out of place. After the plants and shrubs have grown to some height, the outline of the bed may be marked again distinctly when it needs a new dressing, by the contrivance shown in fig. 11, where *a* is a central stake, *b* the arm of any required length, and *c* the rod for scratching. This may be used on all beds of equal size, and may be adapted to any other by boring holes in the arm.

Fig. 10.

Fig. 11.

A good effect is produced in front of a window or veranda by the series of elliptical beds shown in fig. 12. These may be longer and narrower, so as to present an appearance like radiating beds. The elliptical form is more difficult to draw than the circle, but the operation may be performed as shown in fig. 13—two stakes being driven at *a a*; throwing over these stakes the looped cord *b*, which connects the three points *a a c*, and a marking stick, *c*, placed within it and moved around, scratches the ellipse as shown by the dotted lines. By lengthening or shortening the cord loop, and changing the distance of the two stakes, figures of any size or elongation may be readily drawn.

Fig. 12.

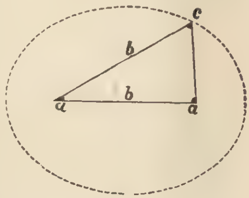


Fig. 13.

A four-sided bed of a more fanciful form may be made as shown in fig. 14, by first drawing the circle represented by the dotted line, dividing it into four parts,

Fig. 14.

and completing the figure by describing halves of circles from centers on these lines where they cross the circle, for the outside, and on centres half way between for the inside circle. A six-sided figure may be similarly drawn by dividing the circle into six parts at *a a a*, and again at the intermediate points, fig. 15. The appearance of such a bed when planted is shown by fig. 16.

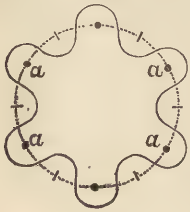


Fig. 15.

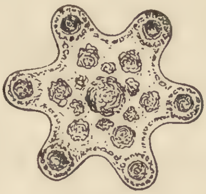


Fig. 16.

The arabesque form, figs. 17 and 18, should be sparingly introduced into any garden, as it not only requires a good eye in laying out, but in preserving the outline in after years. The form is given and the curves made by the mode figured and described on page 292, volume IV, Rural Affairs, Nearly, if not quite as ornamental an effect is given by the grouping of circles as already described. The arabesque forms require at all times the highest finish to the grounds, for nothing can appear worse than an attempt at high ornament with failure from a want of neat and finished keeping.

Fig. 17.

Fig. 18.

It was formerly the practice to form edgings of box plants, but the stiffness of appearance which these produce has led to their disuse. Besides, when beds are cut in turf, but little edging is needed other than the neatly trimmed turf which surrounds them. As it is difficult, however, to keep the turf edge mathematically even, without some guide, it answers a good purpose to place a line of *hard burnt* brick on end just beneath the surface of the soil, as shown in fig. 19. If the soil is well underdrained, these will keep their place a long time, and serve as an accurate guide for

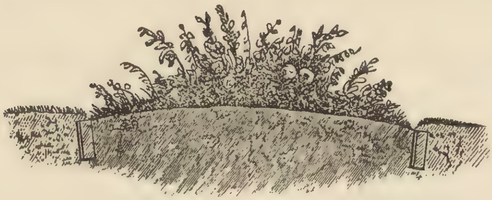


Fig. 19.—*Section of Circular Flower Bed, bordered with hard brick set on end beneath the surface.*

the workman as he trims the curved border of the bed with his spade. These bricks are placed so as to incline slightly outward at the top; but another, and in some respects a better mode is to give the inclination shown in fig. 20, so that the end of the bricks shall form an inclined, smooth circular surface, and make the bed slightly lower than the grass. The brick, pointing inward, may be thus made to fit closely together when they are seen above ground.

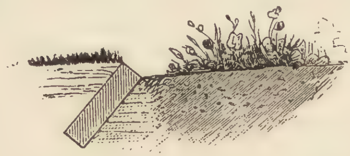


Fig. 20.—*Brick Border inclining inward.*

CONSTRUCTION OF PIGGERIES.

A PIG IS INHERENTLY a clean animal, if he only has a fair chance. No other domestic animal will take as much pains to keep his sleeping apartment clear of all extraneous matter, and none thrives better when removed from the presence of filth. The farmer who keeps his swine in clean apartments, with pure air, receives a much larger return from the food given them, than he who compels them to plunge into comfortless quarters of mud and manure. The first and indispensable requisite for all Piggeries then must be facilities for keeping them constantly clean. To attain this requisite they must be constructed so that—

1. They may be easily cleaned as often as once a day.
2. The eating and sleeping apartments must be separate.
3. The floor, if earth, must be perfectly drained and dry; and if plank, should have a descent for drainage.
4. The apartments, if boarded or walled up, should have free ventilation.

If these particulars were always attended to, we should hear less of diseased pigs and unwholesome pork; and farmers would make fewer complaints of pecuniary loss by pork making.

Simple and Cheap Piggery.

One of the cheapest and simplest piggeries is shown in fig. 21. It is placed, at the rear, against the fence which forms the boundary of the pig-yard. This fence forms the lower side, and should be boarded up tight. The figure will not require much explana-

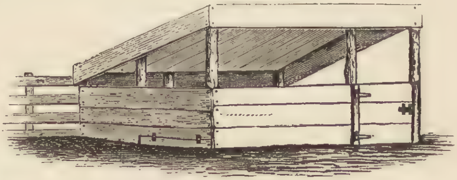


Fig. 21.—*Simple and Cheap Piggery.*

tion. Posts are set for the corners, and if the house is large, intermediate posts may be set for stiffening the sides and roof. These posts should be of some durable wood, as locust, cedar, chestnut, &c. The rear side will be about 4 or 5 feet high; the front 8 or 10 feet, and the longer posts should therefore be about 12 feet long before being set. In the view, fig. 21, the sides are represented as boarded up 3 or 4 feet high all around, and with a good battened board roof. If the pigs are kept into cold weather, it would be better to board up the sides wholly, allowing board slides on opposite sides for light and ventilation. The feed, which is passed in over the front boarding, as in fig. 21, would in that case, be given through a swinging door, which could be pushed in and pinned or latched there till the trough is filled, and then drawn back for the animals to eat. The door shown in the cut is for the attendant to enter the pen for cleaning, but is not necessary in the cheapest and simplest structure, if he can step over. The cleanings may be thrown out through an opening closed with a swing door, shown in fig. 21, or the door may be higher for the admission of a wheelbarrow.

We ought, perhaps, to repeat here, that this building should be placed on high, dry ground, sloping, if possible, in every direction, so that the earth bottom can never be worked into mud.

Fig. 22 shows the plan of the piggery divided into two separate apartments, the front for feeding, and the rear one for sleeping. The partition between them may be 3 feet high, or formed by a single plank set on edge. At the dotted lines there will be an opening, or if a single plank is used, that portion at the place of the dotted lines may be cut down so as to be only a few inches high. If the sleeping apartment is well provided with dry straw for bedding, the pigs will keep it clean, and not allow feed or manure to enter it, even if this division board is not over six inches high. A small door or slide at the back allows them to pass into the yard in the rear whenever they are to be turned out into fresh air. It may be kept open or closed, according to circumstances.

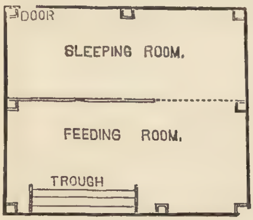


Fig. 22.—*Plan.*

The dimensions of this piggery may be varied to almost any extent. The one which we represent is supposed to be about 12 feet square, and will accommodate five or six animals, varying with their size. The man who keeps but one or two need not make it so large. If desired, it may be made shorter along the fence, and longer towards the front, so as to make the apartments more nearly square, but this is not essential.

The Same Extended.

If more space is required for a larger number of animals, the building may be extended indefinitely along the line of the fence, as shown on a

smaller scale by fig. 23, the cleanings being thrown out through openings closed with swing boards in front.

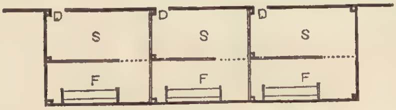


Fig. 23.—*Series of these Pens.*

A stone wall in place of a board fence, will make a warmer and more substantial building, but it will be necessary to make openings through it for the ingress and egress of the animals in connection with the rear yard. This will not be necessary if the yard is in front, but it will be often inconvenient to have the yard and entrance on the same side.

Stone Wall Piggeries.

Another form of piggeries, placed along a fence or stone wall, is shown by fig. 24, and is similar, with some variations, to a plan given in *Harris on the Pig*. It differs mainly from the plan last described, in changing the position of the two apartments, and placing an alley between the two separate pens, from which the feed is given. As with other plans, the shape and size of the apartments may vary indefinitely, but usually 10 or 12 feet square for each pen will be convenient. If openings are made in the rear wall opposite the eating apartments, the animals may go in and out, and the cleanings be discharged through these openings. Otherwise openings may be made in front, large enough to admit a wheelbarrow, and the contents wheeled away to the compost or manure heap. Fig. 25 represents a series of these pens extended as far as desired along the wall or fence, and fig. 26 shows the

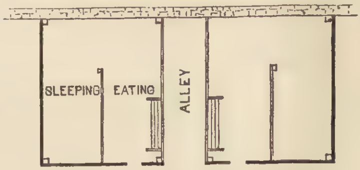


Fig. 24.—*Piggery against a Wall Fence.*

Fig. 25.—*Series of these.*


Fig. 26.—*View of the Line of Piggeries.*

external appearance. In winter the alleys should be closed outside with doors.

Fig. 27.—*Improved Construction of the same.*

Fig. 27 is a piggery on the same plan, but with a more finished and substantial construction.

Management of Pigs.

Harris, in his treatise on the pig, says: "If well-bred and *properly treated*, the pigs will go to their own pens as readily as cows and horses go to their own stalls. This may be doubted by those who ill-treat their pigs—or, in other words, by those who treat their pigs in the common way. But it is nevertheless a fact that there is no more docile and tractable animal on the farm than a well-bred pig. There is a good deal of human nature about him. He can be led where he will not be driven. A cross-grained man will soon spoil a lot of well-bred pigs. * * * Let no such man have charge of any domestic animals. He is a born hewer of wood and drawer of water. At their regular feeding time we can take twenty or thirty of our own pigs and separate them into their respective pens in a few minutes. They inherit a quiet disposition, and we would dismiss on the spot any hired man who should kick one of them, or strike him with a stick, and we cannot bear to hear an angry word spoken near our pens."

The Manure.

This should be daily taken care of, not only on account of its value to apply to land, but to keep everything in order and cleanliness. There are two modes of management. One is to wheel the cleanings from the feeding apartment every day, or twice a day, to the manure or compost heap at a distance; and the other is to throw the cleanings out through the swing board openings, and make a compost heap within the shovel's swing, on the spot. For wheeling out the manure from the pens, there should be doors large enough for admitting the wheelbarrow, (as in fig. 26, where the doors may be higher,) or it may be wheeled away after being thrown out through the smaller openings. If the compost is made on the spot, or near the piggery, there should be a good supply kept under a shed, or otherwise, of muck, turf, loam, chaff, sawdust, &c., for this purpose. If a layer of some of these absorbents, and a layer of the manure, are spread evenly

and alternately with each other, they will, in the course of time, form a most valuable heap of fertilizing material.

More Finished Piggeries.

Figs. 28 and 29 represent a view and plan of a small piggery, intended for a small farm, or for an owner who keeps only a few animals, chiefly for

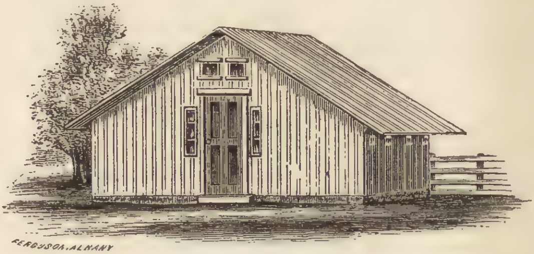


Fig. 28.—*Small Finished Piggery.*

his own consumption, six or eight being about as many as may be comfortably accommodated. Fig. 28 represents the external appearance of the building, which was erected by the writer with two leading objects in view, namely, comfortable quarters for the swine, and little cost of material and work. It was made of rough board siding, nailed on a single but stout frame, with plank floor and battened board roof; the whole, when completed, being thoroughly coated with crude petroleum, applied with a common whitewash brush, to promote cleanliness and prevent decay of the wood. The building is 18 feet long, 12 feet wide, 4 feet high at the eaves, and 10 or 11 feet at the peak—and the whole cost, including lumber, nails, petroleum and work, was only $60. The appearance of the building might have been improved, at a considerable additional cost, by giving it a different form; but it will be seen that no space is wasted, the apartments for the pigs being under the low part of the roof, and the portion for the entrance of the attendant under the higher part. This arrangement admits of a steep slope to the roof, so that all the water from rains is readily carried off, without leakage.

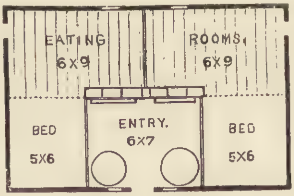


Fig. 29.—*Plan.*

The floor consists of two parts. The nearer part, comprising the entry and the sleeping apartments, is level. The other portion, forming the eating rooms, has a slope of 4 or 5 inches in 6 feet, in the direction of the plank, keeping these rooms well drained. Along the whole length of the rear side, or at the end of these sloping floor boards, is a board

about six inches wide, hung on hinges at the upper edge, so that it may be readily hooked up, leaving an opening through which the droppings may be easily scraped, shovelled or otherwise cleaned out, twice a day or oftener. This opening serves as a place for the admission of fresh air in warm weather, but may be closed when the air is cold. The surface of the ground should be lower at the rear side of the building, so as to allow plenty of space for the discharge of the manure, and also for the daily application of turf, loam, straw, or other absorbent, to retain the richness of the manure, making a compost heap on the spot outside, and to prevent the foul odor from arising and entering the building, or from floating off towards the dwelling, where nothing of the kind is wanted.

Over the entrance door, as will be seen in fig. 28, are ventilating doors, opened by sliding boards ; and on the opposite side are two others for the same purpose. These are kept open at all times, except in cold weather, so as to allow free passage of fresh air.

The partition between the two eating apartments is provided with a door, and the two are readily separated or thrown together, as may be desired. Doors for entrance and egress may be placed at either or both sides of these rooms. The sleeping rooms are separated from these by a board set on edge on the floor, 5 or 6 inches high ; this keeps the bedding entirely separate from the eating rooms, and the pigs will never allow matters to become mixed, but always keep their beds perfectly clean.

Tubs for scalding the meal are placed in the entry. These tubs are advantageously made by cutting in two parts, through the middle, large petroleum barrels, each barrel making two tubs, which, having been thoroughly soaked with oil, do not rot or emit a fermenting odor. One heaped pail of Indian meal, with four pails of boiling water poured on it and covered, will form an excellent mash or pudding for the swine in 12 to 18 hours, and be worth twice as much for fattening as the corn before grinding into meal. It is very readily fed to the animals through an opening from the entry to the trough, protected from the snouts of the pigs till the troughs are properly filled and ready, by means of a swing door.

Large Piggery.

Fig. 30 represents the view of a large building, comprising eighteen separate apartments for pigs, and suited to large establishments. It is so arranged that it may be diminished in size if desired, by taking off four pens at each end, leaving only ten ; or it may be increased to an indefinite extent by adding at the ends, without interfering at all with the general plan.

The same principle is adopted in this piggery as in the one already described. That is, the feeding pens are placed on a sloping plank bottom, (fig. 31) so as to be readily cleaned, the contents being pushed or shovelled through the horizontal slits, on a level with the floor,) which extend along each side. The food is given by the attendant, who passes into the

Fig. 30.—*View of Large Piggery.*

alleys C C C for this purpose. The troughs extend part way across the upper end of the feeding rooms, with a partition boarded up above them; but at the divisions between the feeding rooms F and the sleeping apartments G, there is a board fixed on edge, only 5 or 6 inches high. This holds the clean straw or litter to its place, preventing it from becoming mixed with the manure. The animals being naturally cleanly if they can only have a fair chance, will take particular pains that no manure intrudes among this litter, and in this respect are superior to nearly all other domestic animals, which generally have no scruples of the kind.

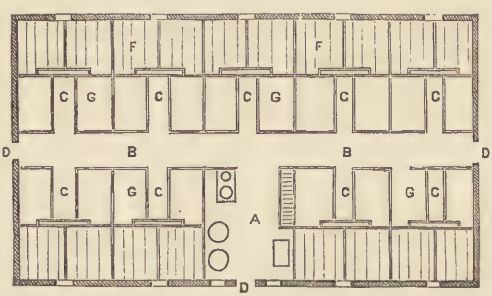


Fig. 31.—*Plan of the same*—D D D, *entrance doors*; B B, *passage*; *A*, *store and cooking room*; C C C, *feeding passages*; F F F, *feeding apartments*, 18 *in number*; G G G, *sleeping apartments*, 18 *in number*.

The pigs may be made to enter through either of the three doors, according to the position of the building and its connection with the yard. Sliding doors are made for all the apartments through which they pass, and there will be no difficulty in having every one know his proper pen if they are kindly fed and coaxed at the start, instead of being beaten, as too frequently happens to be the case. There may be sliding doors likewise between the apartments, so that the animals may pass from one to the other, or for enlarging their rooms by throwing two or more together.

The space A contains the cooking apparatus, boxes and tubs for feed, and the stairs to the loft above, which will hold a large supply of grain or meal. The windows at the sides are so placed that each of them may afford

light to two apartments, which will be necessary when cleaning, and they may be closed with board shutters at other times for the quiet and repose of the occupants.

This plan has the advantage over many others in the uniform surface of the floor—the central portion being level, and the side portions, which form the eating pens, having enough slope to facilitate drainage and cleaning. By a good supply of clean straw for bedding, and by insisting on the attendant giving all the eating rooms a thorough cleaning as often as twice a day, this building need have no bad odor within it. And if the cleanings, when thrown out, are properly mixed with straw, loam, turf, &c., and drawn away frequently, there will be no bad air to circulate outside.

The size of the apartments may vary with circumstances. If small, they must have but few occupants for each; if larger, they may have more. We shall suppose that in this plan they are as follow: The feeding pens 5 feet wide and 7 feet long; the sleeping apartments 4 feet wide and 6 ft. long. These dimensions are much less than many owners would make them, but there is an advantage in having few animals together. It is easy to make them wider and fewer in number, so that in the same space there may be only half as many, each being 7 by 10 feet for feeding, and 6 by 8 feet for sleeping apartments—making two of these large rooms at each corner of the building, two next to them, and the two smaller ones opposite the cooking room, fig. 32. The whole size of the building, allowing 5 feet for the width of the long passage, would in either case be 50 feet, long and 31 feet wide. This size may be varied to an almost unlimited extent, without any alteration of the general plan.

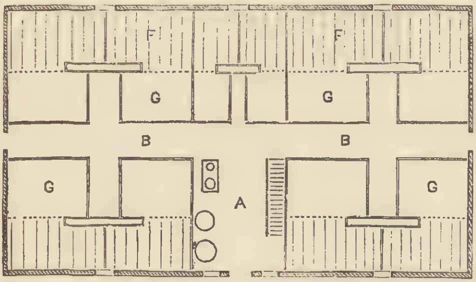


Fig. 32.—*Modification of Plan, fig.* 31—B B, *passage between entrance doors;* A, *cooking room;* F F, *feeding apartments,* 10 *in number;* G G, *sleeping rooms,* 10 *in number.*

QUINSY IN SWINE.—A correspondent of the COUNTRY GENTLEMAN says the following treatment is usually beneficial for this disease:

In the first stages give a brisk purge (salts or oil); apply a flannel wrung out of hot water to the throat. Later it will be well to blister for 15 or 20 minutes with a mixture of turpentine and mustard; this must be washed off or it will make a bad sore. Give the following: Powdered chlorate potassa and powdered carbonate ammonia, equal weights—dose, teaspoonful three times a day.

THE CULTURE OF NATIVE PLANTS.

CULTIVATORS OF ORNAMENTAL PLANTS would add much to the beauty of their grounds by securing and planting more of the wild flowering perennials of the woods. Our gardens are too exclusively of an exotic character. An additional charm would be added to such collections by the recollections they would afford of forest rambles. Those who have any taste for botany would derive many pleasing associations of the "pleasure in the pathless woods," and the "rapture on the lonely shore," where beautiful solitary flowers and clusters of floral gems were discovered in their scientific explorations. There is still another reason for a more general adoption of native plants. Land owners of late years have learned the advantages of refreshing shade for our hot summers, and many of their gardens, where exotic flowers bloom only in copious sunshine, are beginning to suffer from the extension of dense foliage. They do not wish to cut down favorite trees, and the only way they can enjoy both trees and small flowers is to plant those that bloom freely when hidden from the sun. Now all our native plants which grow in the woods will grow and bloom under the shade of trees in gardens.

Some of the finest gems of the floral world may be still found in their native localities, and they are worth the effort to retain and preserve them, now that they are retreating with the disappearance of the forests. Plant them in shady places, and the walks, instead of being bare of vegetation, will become really fascinating when the ground beneath the dark trees is "gemmed with blossoms."

We propose to name and briefly describe a few of our many wild ornamental plants which have perennial roots and will continue to grow and bloom year after year, the chief care being to prevent their being crowded out by the encroachments of other plants, or of grass and weeds. Some will ake care of themselves and hold their own ground, while others need a little protecting care.

Nearly all these plants may be taken up any time after they have flowered and ceased to grow. Some, like the *Hepatica* and *Pyrola*, may be readily found by their evergreen leaves ; others, like the Phloxes and Lilies, are soon lost by the dying down of their stems, and the places where they stand should therefore be marked with sticks while the flowers render them conspicuous, so that they may be easily found and dug up a few weeks afterwards.

In addition to common garden beds and beds in the shade of trees, some of these plants are peculiarly adapted to artificial rockwork. Among these are our handsomest and most delicate ferns, (fig. 33)—trailing plants like the *Epigea repens*, and where there is moisture enough, the finest growing green mosses. In order that this rockwork may look well, there should be enough mould between the blocks to allow the plants to root and

Fig. 33.—*Ferns and Rocks.*

grow freely and partially cover the surface. We may add the three essential requisites of artificial rockwork, namely: avoiding level ground, always select, in the first place, a hillside or an undulation, where the rocks may properly form a portion or the walls of a ravine; secondly, use blocks or masses of stone weighing two or three tons if possible, so as to give the

Fig. 34.—*Rockwork and Plants.*

whole a massive and durable appearance; and thirdly, never leave the crest bald, but always cover it with a crown of dense growth. A pile of stones on level ground appears puny and out of place. The finest natural rockwork which we occasionally see, with masses weighing hundreds of tons, the crevices lined with delicate flowers, and the summit crowned with

huge old trees, with the twisted roots winding between the rocky masses, cannot be imitated artificially, but we should approach as near this picture as possible, (fig. 34.) When permanent streams of water of considerable size are at command, or even small, trickling rivulets, they can be made to form combinations with mossy rocks, crests of scattered flowers, and gnarled old tree roots, of surpassing beauty.

The following are among some of our best native bloomers. The engravings represent them all reduced one-half the natural diameter :

Fig. 35.—*Hepatica.*

HEPATICA TRILOBA, (fig. 35,) sometimes called liverwort, is one of the very earliest flowers which appear in our woods, blooming almost as soon as the snow has gone. The leaves remain evergreen through winter, and new ones spring up after the blossoms have gone. The flowers vary in shades from nearly white to pink, purple, and almost blue. This plant grows in thin woods, and is easily transplanted to gardens, forming dense and beautiful masses of bloom either in open beds, or under the partial shade of trees. By marking plants when in flower in the woods, all the different shades may be obtained and intermixed in the garden. Dr. Gray, and other botanists, make two distinct species of the sharp and rounded leaves, but we have found them of all intermediate variations, showing that these are only varieties.

Fig. 36.—*Claytonia Virginica.*

CLAYTONIA VIRGINICA, fig.36, (known by the English name of "Spring Beauty,") is one of our earliest flowering plants, appearing nearly as soon as the Hepatica, and bearing handsome pink striped blossoms. It grows freely in open garden beds or in partial shade, although not as yet generally cultivated.

PULSATILLA NUTTALLIANA, or Western Pasque Flower, (fig. 37,) is found in Wisconsin and adjacent regions, and blooms very early in spring, the flowers coming up first and the leaves afterwards. As it is perfectly hardy,

and grows on gravelly knolls, there is no reason why it may not be made to form handsome garden beds, affording its bloom with Hepatica, to which

Fig. 37.—*Pulsatilla Nuttalliana.*

it is allied, being placed by some botanists in the same original genus, Anemone. Its name *Pasque* flower comes from its flowering about the time of Easter day. The flowers (sepals) are light purple, and spread 3 inches in diameter, the engraved figure, like the others in this article, being only one-half the natural diameter.

Epigea repens, fig. 38, (known by the common name of Trailing Arbutus, and sometimes as Mayflower,) is one of the most delightful gems of our native woods. It generally blooms very early in the spring; has handsome, rose-colored, very fragrant flowers, and although the plant is strictly an evergreen shrub, yet its prostrate or trailing form gives it more of the character of simply a low perennial plant. Although not abundant anywhere, it is found in many localities in sandy woods, rocky soils, or along the sides of shady ravines. It would form an admirable ornament at the base or in the crevices of partial rockwork, where plenty of soil could be placed; and although somewhat difficult to transplant, it will succeed well if plenty of earth is taken with the roots, and the stems kept closely to the surface of the soil.

Fig. 38.—*Epigea repens.*

Erythronium Americanum, fig. 39, (called Dog's Tooth Violet and Yellow Adder's Tongue,) grows abundantly in many localities along the

borders of woods in thin copses, and bears small, elegant and graceful yellow flowers, early in May, immediately following the earliest spring sorts already described. It grows in thick masses and blooms abundantly when removed to garden beds, where but little care is required for its successful growth.

Fig. 39.—*Erythronium Americanum.*

Fig. 40. — *Sanguinaria Canadensis*(*Bloodroot.*)

SANGUINARIA, (or Bloodroot,) fig. 40, bears clear white, handsome flowers, quite early in spring ; the roots are thick, fleshy, prostrate, and full of red juice, whence its name ; and when planted in garden beds they need little care for years, and increase and send up a profusion of flowers every spring.

MOSS PINK, (*Phlox subulata,*) fig. 41, although a native, is already well known in ornamental gardens. The ease with which it may be propagated by dividing the rooted plants, and the little care required, except keeping it clear of grass and weeds in the garden bed, as well as its showy appearance when in dense bloom early in the season, render it a great favorite. Its color is rose or pink purple. It grows wild on dry, rocky hills and sandy banks from New-York to Michigan, and farther southward. *Phlox setacea,* formerly supposed to be a distinct species, has also pink flowers, and a variety of this, *P. nivalis*, bears pure white flowers, and all of these, grouped together, make a showy and brilliant appearance.

Fig. 41.—*Phlox subulata,* (*Moss Pink.*)

PHLOX DIVARICATA, fig. 42, a fine late spring flower, presents various shades of pink and pale purple, and blooms finely in the shade of woods.

Fig. 42.—*Phlox divaricata.*

Fig. 43.—*Trillium grandiflorum.*

TRILLIUM GRANDIFLORUM, fig. 43, (sometimes known by the awkward name of the Large White Wake-Robin,) has large white flowers from three to four inches in diameter when spread out, and makes a handsome appearance under the shade of trees. The flowers remain long, and finally turn to a pale rose color. It grows in rich woods in many places in the northern States, often in great abundance. It is easily managed, and may be planted in masses or as scattered plants.

Fig. 44.—*Silene Pennsylvanica.*

SILENE PENNSYLVANICA, fig. 44, one of several plants known by name of Wild Pink, is one of the most showy of all our smaller native plants. It is found in many places throughout the country, and although not much cultivated, we have found no difficulty in obtaining brilliant displays of its flowers in garden beds in the open ground. It grows from four to eight inches high, forming dense masses of purple rose-colored blossoms. It is often found in gravelly and rocky places, and would succeed well on rockwork where not much shaded.

THE BLUE GENTIAN, (*Gentiana saponaria,*) fig. 45, called also the Bottle Gentian, Soapwort Gentian, and Closed Gentian, blooms in autumn, and has conspicuous dark blue flowers, the petals of which always remain nearly closed. It grows in moist woods and along rocky streams, and is well worthy of a place in the woody flower garden on account of blooming when most other flowers have disappeared. The Gentians generally are

somewhat difficult of culture, but this will succeed in a mucky, moist soil in the shade of trees.

Fig. 45.—*Gentiana saponaria.*

Fig. 46.—*Lygodium palmatum.*

Lygodium palmatum, (fig. 46,) the Climbing Fern, has a slender wiry stem, twining closely around small shrubs and other objects. It is not a common plant, but is found in occasional localities from New-England to Florida, in shaded, moist places; and its smooth, delicate form makes it a pleasing object in the wilder portion of the grounds.

Some native plants require moist, mucky soils, and might succeed well in a bed of pond mud, or vegetable mould along the borders of water. Among some of the handsomest of this class are *Arethusa bulbosa*, *Calopogon pulchellus*, *Orchis fimbriata*, *Cypripedium spectabile* and *Pogonia ophioglossoides.* The Fringed Orchis will grow well in a shaded border deeply filled in with muck, and when in bloom is a beautiful garden ornament.

In addition to the plants which have been named, the following may be added: *Lilium Philadelphicum*, (Wood Lily,) with large, bright orange flowers, possessing the quality of blooming freely in the dense shade of trees. *Lilium Canadense*, (Meadow Lily,) remarkable for the graceful form of the whole plant; often seen in meadows. *Anemone nemerosa* and *A. thalictroides*, delicate and handsome spring-flowering plants, growing wholly or partially in shade. *Aquilegea Canadensis*, with graceful red and yellow blossoms, growing freely in rocky places, and making a fine show in the garden in early summer. *Viola pedata*, (Bird's Foot Violet,) with rather large, pale blue flowers, opening in May. *Polygala panciflora*, a delicate plant, with rose-purple flowers, sometimes white, growing in woods and blooming in May. *Linnœa borealis*, a slender, creeping or trailing little

evergreen, bearing small, fragrant, nodding, whitish flowers, well adapted to moist or mossy rockwork. *Mitchella repens*, a small trailing evergreen, with fragrant flowers, growing in dry woods and about the roots of trees, suitable for dry and shady rockwork. *Campanula rotundifolia*, (Harebell,) a slender, graceful plant, with a bright blue bell corol, growing on shaded, rocky banks, and often presenting a beautiful ornament on the face of rocks near waterfalls; and *Asclepias tuberosa*, with various shades of yellow and reddish orange flowers, which make showy masses when seen at a distance on the grounds. It blooms late in summer, and the various shades may be secured by marking the plants when in flower, and taking up the roots afterwards. In speaking of one of the smaller plants just named, *Linnæa borealis*, Alfred Smee says, "It is the smallest of all the honeysuckles, and that great naturalist, Linnæus, chose it as a type of himself because it had so lowly an origin. He obtained permission to use it as his coat of arms. It is a scarce plant, and I can hardly describe the pleasure I have found on discovering it in its native wilds. We are not restricted to foreign plants; our very woods and fields are beautiful with flowers."

In those portions of the grounds deeply shaded by evergreens overhead, many plants will grow and bloom that would be destroyed if exposed to the open cold of winter. In such places small evergreen trailers, intermingled with ferns, will present a most attractive appearance during open weather in winter or very early in spring, and among some of these we may mention *Gaultheria procumbens*, *Epigea repens*, *Pyrola maculata*, several species of *Saxifraga*, &c., to whieh may be added the different species of *Lycopodium*, and a large number of our more delicate native ferns which grow on the banks of ravines and in the dense shadows of our woods.

Sowing Flower Seed.—The rule which we have adopted for beds in open ground is to cover all seed from three to five times their shorter diameter—small seed receiving only a slight sprinkling, and larger a more copious sifting of the fine mould. No seed should be sown when the soil is not dry enough to be reduced to fine powder. The best soil is sandy loam, but a larger proportion of clay makes a good material if dry enough to be made perfectly mellow. The addition of sand and leaf-mould will make any soil of proper consistency. The best way to sow seeds is, in the first place, in drills or circles; then the weeds may be easily taken out. If sown broadcast, it will be more difficult to keep the bed clean. Provide a quantity of finely pulverized mould in a basket or barrow, and cover them by sprinkling it evenly over with the hand. Avoid soaking the beds with water until the plants are up. If the surface is likely to become too dry after sowing, which is often the case, put on a thin gauzy mulching. This may be pulverized moss, thin canvas, or even a newspaper. Every person who plants a flower garden should know the hardy plants—which usually come up soon, and may be sown early—from the tender, which are often more tardy in appearing, and should be sown later.

MARKET GARDENING.

By W. D. Philbrick, Middlesex County, Mass.

COMPETITION IN RAISING good vegetables has become so close in the neighborhood of our principal cities that the market gardener must use constant care, combined with skill and hard work, to succeed; and the best gardeners also use considerable cash capital, very much larger than is needed for farming operations. The best skill and care are not always successful; we have yet to learn an effectual remedy for the cabbage maggot and caterpillar, and the club root; for the mildew in the lettuce bed and maggots in onions; and besides, the capricious nature of our climate will at times thwart our best efforts and disappoint our best hopes. Still energy, skill and industry are generally successful in this as in other pursuits, and thorough work will almost always be found the cheapest in the end.

General Management—Manures.

The market garden should be within eight miles of a good market, in order to admit of daily trips of the produce-wagon and manure-wagon. The land may be of various character for the different crops raised, but to raise the best vegetables a considerable portion should be a very deep loam, well drained, but not too light.

The capital will vary much with the circumstances of the gardener, but in the best gardens will be not far from $700 per acre. Thus a ten-acre garden will employ usefully:

Hot-bed sashes, with fittings, 500,	$3,500
Three good team horses,	750
Wagons for produce, manure, &c.,	700
Plows, tools, &c.,	300
Total fixed outlay,	$5,250

Besides which, money will be needed to pay for a good stock of manure, to pay the laborers, &c., until the crops begin to come in. The first two years on a new market garden are almost always unprofitable, even in skillful hands, for it requires this time to bring ordinary farm land up to a paying state in vegetables, and the first crops will not repay the outlay needed for manures and labor. A farm of ten acres will need, when in the highest state of tillage, a force of eight men with two or three women or lads during the summer, and two or three men and a lad during the winter. The manure applied will be the product of 100 horses, say 150 cords of raw manure, beside considerable quantities of night-soil and any other strong refuse available. The manure will cost, delivered at the farm in this neighborhood, about $10 per cord, say $150 per acre; night-soil, 12 loads, $48; making $198 per acre.

Of course some crops, such as early cabbage and lettuce, will need more

manure than this average, while others, such as tomatoes, peas, potatoes, corn and cucumbers, will need much less. The outlay for manure and labor on some of the best gardens will exceed $500 per year per acre. The returns will often exceed $1,000 per acre, but sometimes fall below the outlay.

It is the constant aim and endeavor of the gardener to keep all his land in productive condition, making it yield if possible two, and sometimes three, crops in the year, and in doing this there is ample opportunity to employ the energy, skill and industry of a man of brains. A few illustrations will serve to show how we manage. Land which is light and dry is not suited to produce celery for a late crop, but will do well with squashes, cucumbers and tomatoes. These will be raised on the same land which has produced early peas, cabbages, greens, lettuce, or onion sets. The heavier land, not liable to suffer from drouth, will bear celery for a second crop, preceded by early beets, onions, cabbages and potatoes. Dandelions, rhubarb and asparagus do not admit of any other crop being raised with them, except that in planting a new bed of asparagus we often take a crop of greens or early beets between the rows the first year. There is some land light and mellow enough to work early for lettuce, and yet moist enough for celery; this can be made to bear three crops—1st, winter spinach, onion sets or early lettuce ; 2d, cucumbers or melons ; 3d, celery.

Very much will depend upon the skill of the gardener in preparing his manure and land so as to be in the best order with as little labor as possible. The best tools and machines only should be used, and horses made to do the work of men wherever possible. The manure for garden crops should be moist and fine, the product of composting horse manure with refuse hops, night-soil, slaughter-house offal, &c., working over until the lumps are all worked fine. This will generally require two or three months' time, and two or three turnings. A good plan is to have a tight platform for the manure heap to stand upon, made of matched plank or tar and gravel, sloping toward a tank at one side, which will gather the rich liquid drainings ; if the manure heap becomes too hot, the liquid should be bailed up or pumped upon the heap to cool it down, and as soon after as convenient turn it over. In this way much waste matter, such as sods, weeds, refuse vegetables, pea haulms, &c., can be worked up into an excellent manure, better, I believe, than being torn by hogs, who after all only half do, the work, and are an unprofitable nuisance besides.

The utilization of night-soil is one of the most interesting problems in connection with manures. Great quantities of this most valuable manure are daily poured into the harbor of Boston, to the great danger of the public health. The solid portion sinks to the bottom near the places of deposit, and is often left exposed by the receding tide to the scorching sun, which creates a most disgusting nuisance. The city scavengers will deliver it at $4 per load of 80 cubic feet, within 8 miles of the city, but the demand for it among the farmers is less than the supply, and is limited by the nuisance and labor attending its application. It is universally admitted to be a cheap and strong manure, stimulating a rapid growth of leaves.

The easiest way to apply it is to drive the city teams directly upon the land, where it is discharged into a series of small pools about a rod distant from each other, from which it can be spread by a hand basin and shovel. It frequently happens however that we wish to apply the manure at such times that it is impossible to get the city teams on at the right moment. For this reason some of the enterprising gardeners of Arlington have built cisterns of matched plank, 30 or 40 feet square and 12 feet deep, for storing preparatory to the spring planting. The city teams fill these tanks at their pleasure and the farmer draws it out when he needs it, distributing by a tight covered two-wheeled cart. The cart is loaded by means of a wooden spout at the bottom of the tank, with a valve, when the land falls away enough to admit of this very convenient arrangement; otherwise the cart must be loaded by bailing or hoisting with horse and crane, after the manner of discharging coal from schooners. A good way to distribute it is to discharge the cart into a row of half-hogshead tubs, and spread by means of a basin. The frequent occurrence of solid refuse, rags, &c., makes it difficult to handle by any plan adapted to the use of liquids only; it will clog any pump, and will not pass through a wooden spout of much less than six inches bore without frequent clogging. Perhaps a more convenient method would be to filter the whole into the cistern, after which it could be handled by means of pumps and pipes. I am not aware that this plan has been employed. Ten or fifteen loads of 80 cubic feet each are often applied to the acre, after which the land is plowed or harrowed deeply. It makes the best of cabbages, asparagus and rhubarb, but should be used in alternation with other manures.

Whatever kind of manure is used, enough of it is essential to success. An old German gardener on his death-bed advised his son—"Mine sohn, run in debt to no man, but if you *must* borrow, let it be for *manure*."

Cultivation—Useful Implements.

The land should be drained if not naturally dry, and cleared of all small stones and rubbish, in order to admit of clean culture, straight rows and thorough work. It will cost double to clean the weeds from an onion bed if stony, and this extra labor might just as well have been spent in picking off the stones as in picking the weeds. Among the best tools we have for labor-saving in the garden is the Alden horse-hoe or cultivator with thills, (fig. 47.) This tool can be run within an inch of growing crops if the rows are straight and the land free

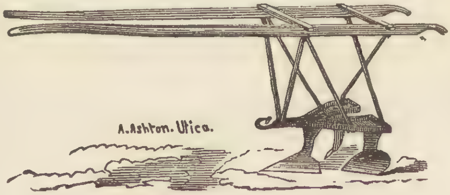


Fig. 47.—*Alden's Cultivator.*

from stones. Potatoes and corn can be worked with it *without any hand-hoeing* and kept cleaner than most fields where the hoe is used; the land, however, must be clear of stones, and the horse-hoe run before the weeds are an inch high; even carrots and beets can be worked by it without the hand hoe. The thills give a steadiness of motion attained by no other cultivator. The Keniston scuffle hoe, (fig. 48,) is another invaluable tool where the rows of the crops are too close to admit a horse, as with onions, greens, &c. This implement has all the advantages of a wheel-hoe, and is much simpler and can be made by any blacksmith. The drawing will show the construction; the guard in front of the cutting edge prevents the blade from running too deep into the ground, and is simpler than a wheel; the blade is made about 3 inches narrower than the space between the rows to be cultivated; the handle should be 6½ feet long, and it is pushed before the workman almost as fast as he can walk. It will not do to wait for the weeds to get more than an inch high with this tool, it will then sometimes fail to kill them—it is much better to kill them before they get above ground at all.

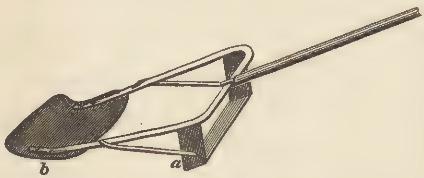


Fig. 48.—Keniston Scuffle Hoe—*a, cutting edge of steel; b, iron guard.*

Another invaluable tool is the seed drill. Harrington's is a very good one for most seeds; it does not sow beets well however, and the covering roller is not heavy enough for sowing in dry weather such seeds as celery, dandelions, spinach, &c. A much better and more expensive machine is made by John Fillebrown of Arlington, Mass., (fig. 49;) it regulates the depth at which seed is sown, the pressure of the roller, and the thickness at which the seed is sown so perfectly as to astonish any one not familiar with it. Carrots and onions sown by it by a skillful hand will scarcely need thinning.

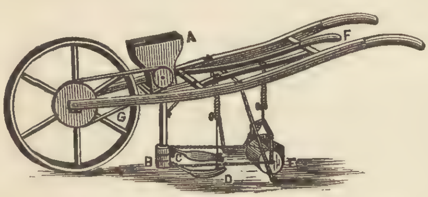


Fig. 49.—Arlington Seed Drill. A—*Seed Hopper;* B—*Drill;* C—*Thumb Screw to adjust the depth of seed;* D—*Shoe to cover seed;* E—*Roller provided with Scraper and Adjustable Spring to regulate pressure of Roller;* F—*Lever by which delivery of seed can be stopped;* G—*Rubber Band to communicate motion to brush inside hopper.*

To be sure of good crops it is essential to have good seed, not only seed that is sure to come up, but seed that has been selected with care in reference to its purity from mixing with other sorts. It is a difficult thing to find at the seed stores cabbage, lettuce, squash, cucumber, melon, and many

other seeds, that are true to name and unmixed with others of kindred nature. It requires more care and labor than most seed raisers are willing to bestow to obtain a first rate article of any of these seeds; for this reason the best gardeners are in the habit of raising their own seeds or exchanging with some trusty neighbor, and buying as little as possible at the store. The seed of peas and potatoes, spinach and radish, however, can be obtained of better quality at the stores than by raising here; and we have little trouble in obtaining good onion, beet, carrot and parsnep seed, as well as grass and grain, of any responsible dealer.

Marketing—Miscellaneous Notes.

The preparation of vegetables for market is a quite important part of the business, and often requires as much labor as to produce them. Thus it will cost as much to store and wash celery for winter sales as to raise it; and the pulling and cleaning and bunching of rhubarb costs more than to raise it; the same is true of asparagus and many other bunched crops. For this reason the best gardens are provided with every convenience for saving labor in the wash house. When winter marketing is followed, the wash house must admit the market-wagon and be warmed by a stove, so that vegetables can be prepared during the day, and the wagon loaded under cover, where it is allowed to stand until an hour before the market opens, when it is well covered up with blankets and driven to market before it has time to freeze through. Many gardens are provided with a supply of water under pressure from some neighboring spring, which is a very great convenience, as the quantity of water needed to wash vegetables and to water the hot-beds well is very considerable. The wash house is provided with ample benches for tying up and assorting the vegetables, and with an abundant supply of boxes for loading the wagon; we do not use the basket at all in Boston market—all vegetables are marketed in wooden boxes holding a bushel, or in larger ones holding a barrel, or in barrels.

The marketing is generally done by a trusty man employed by the farmer, who works about the place when not needed on the road. All sales are *cash*, and no claims allowed after goods are delivered. The fluctuations of the vegetable market are curious to note, as they are little influenced by speculation; supply and demand govern the rates, which are more various than with most other kinds of merchandise, and depend frequently very little upon the quality of the goods. Thus a damaged article of tomatoes, peas or cucumbers, brought here from Bermuda or Norfolk, will sell at five or six times the price paid for a prime article from the neighborhood a few weeks later. In fact the cities seem to be full of people who are constantly craving something new before it can be produced in good condition, and when the really good article comes to market they are tired of it and want something else. They are thus constantly paying great prices for damaged goods, because they must have them before the proper season. This impatience for something new has built up a great trade in early stuff, which is sent north in great quantities from Charleston, Norfolk, New-Jersey and

Bermuda, to the great injury of the gardeners hereabout. During the recent war this trade was interrupted, and the gardeners here had things for a time pretty much their own way; at present we are devoting more attention to the storage of late crops for the winter market; celery, squash and spinach in large quantities are stored for sale in the winter months, and generally repay the skill and care needed for keeping them quite well. The celery is stored in frost-proof pits covered with boards and seaweed or other litter, (fig. 50.) This same pit will serve well to keep cabbages or cauliflowers or spinach, for a few weeks at a time. The squashes are stored in houses built for the purpose, the loft or second story of the wash house being often used for this purpose; the squashes are laid upon shelves not more than two deep, and are turned over frequently to pick out the specked ones. The essential in keeping squashes is a dry place that never freezes. A stove that will hold a good fire all night is of course essential; the temperature should be as uniform as may be, ranging from 35° to 45°. They can be taken out in very severe weather and driven to market without freezing if care is taken to cover them up well.

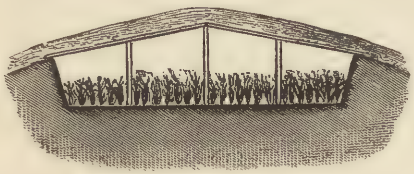


Fig. 50.—*Section of Celery Pit.*

Hot-Beds—Irrigation.

The hot-bed described in the last number of the Annual Register is one of the most indispensable helps in forcing early crops, and in raising plants for setting in the field. By means of it we raise early lettuce and radishes, and dandelions, for sale in the winter and early spring, and without it we should be unable to grow many of our field crops early enough to command a good price in market, or to be followed by a second or late crop on the same land. The early lettuce, cabbage, tomato, cauliflower, pepper and egg plant must all be forwarded under glass, and even celery and potatoes are often started for early market in the same way. Citron, melons and cucumber plants also are raised under glass for planting out. In fact no good gardener can do much without hot-beds, and skill in managing them is generally a proof of a good gardener. Their management requires much skill, hard work and, above all, constant watchfulness; the constantly changing weather will try the patience of any but the best and most devoted workman.

The greenhouse has superseded the hot-bed to some extent for raising winter lettuce, radishes and cucumbers; it is more manageable in severe weather, and requires less labor; but for spring work, especially the raising of good stocky plants for the field, the hot-bed is much preferable, and its simplicity of structure and cheapness will always commend it.

A plentiful supply of water is a very important help to a good garden; the wash house and hot-beds must have it, and there are field crops which are often much benefited by judicious watering—among them, early cucumbers, late lettuce, celery and strawberries.

Many gardens are supplied with aqueducts from some neighboring spring. Where this cannot be done, water is sometimes pumped by a windmill to an elevated reservoir, whence it is distributed by pipes. In some places the water ram can be used with advantage. Where the means are not at hand to employ these methods, water is often bailed or pumped from a neighboring pond and carried to the garden in a molasses hogshead mounted on a tip cart. One or two gardeners of Arlington are supplied with a powerful steam pump with underground pipes and hose to attach and deliver water at the rate of a hogshead per minute. It is only by the most thorough work, and by applying every means in our power that we can expect to obtain the best crops in our ever-changing climate; our gales are so severe, our summer sun so scorching hot, our drouths and floods so frequent, that the best results are rather difficult to attain. The skill of the gardener is shown in being ready beforehand to meet the changes of the seasons, taking advantage of their turns as the skillful mariner trims his sails to meet the ever-changing wind. The land must not only be well tilled and manured—these are the prime essentials, of course,—but it must be drained, naturally or artificially, to provide against floods; it must be irrigated in time of drouth, or other means taken to prevent excessive evaporation, and, above all, good judgment must be used in planting crops suited to the land, and everything must be done at the right time, and done thoroughly, to insure success. In no other calling is it more true that "anything that is worth doing at all is worth doing well."

Gardening is certainly a laborious calling; probably there is no class of men in the community who devote more hours of hard labor to their calling and who, as a rule, are more poorly paid; there are instances of poor men working up in the garden to own the farm, and even have a deposit in government bonds, or a loan to some neighbor on mortgage; but for every instance of this kind hundreds could be named who obtain a bare living by the severest kind of sacrifice. I can only account for the fact by supposing that the garden has fascinations quite independent of the question of money. It is healthful; it calls into action some of the best characteristics of mankind—industry, intelligence, skill, together with a tact at making a bargain; and if one is not brought in the garden into so close contact with other men as in the city, one certainly has oppertunities to cultivate a healthful love of the beauties of nature, which ought in all true men to lead them to love and adore the Lord as the Creator of everything beautiful. Besides, one has the opportunity to study in the garden those analogies between the outer and inner world which are to many most interesting. Can we not see in the vile weeds which so constantly annoy us the danger of allowing vicious habits to take root in our life? And is not the growth of useful crops, nourished by offensive refuse, like a constant miracle?

Led on by attractions of this kind, there are frequent instances of broken down merchants attempting to make a living at gardening. With expensive habits of living, without experience or capacity for adopting the experience of others, without the power of enduring hard work, with a too scanty capital, saved perhaps from the wreck of a city ruin, they generally fail. Like other pursuits, gardening requires capital well directed by intelligent experience, and care without end.

HOUSES OF MODERATE COST

By B. W. Steere, Adrian, Michigan.

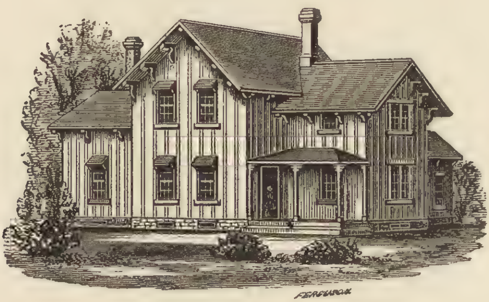


Fig. 51—Design I.—*Dwelling with Wings.*

THERE IS A LARGE and rapidly increasing class in our country whose habits and associations require in their dwellings not only the modern conveniences, but more of the means for the exercise of taste and the refinements of the age in which we live. They are no longer fully satisfied with the hastily planned and inconveniently arranged houses that their fathers were content to dwell in, and in which their own childhood may have been happily spent. Their education and course of reading, especially of the agricultural and horticultural journals, which of late have given so much attention to landscape gardening, architecture, and other kindred subjects, have created in their minds a desire for something better, both as regards inside arrangement and outside appearance. This is surely a laudable desire, but how shall it be gratified—as we, (for I feel that I am one in sympathy with these,) are mostly in limited circumstances, having but a few hundreds, or at most but a thousand or so to spend in the erection of our dwelling? An effort has been made in the following designs to assist in meeting this want; and it may be well to state that they have been very closely, not to say selfishly, studied, and some of them remodeled many

times, with a view to gratifying our own desires as a family, should we have to build again. The question has naturally occurred, if suited to our requirements, why not to others' of like tastes and circumstances? Being designed for a certain class, and to meet a peculiar set of wants, of course some features will be repeated, as amount of accommodation, number and size of rooms, &c. The small kitchen will be found in all; yet in most cases this, as well as the other rooms, can be enlarged if preferred, without altering the design. It is supposed the wives and daughters of those who may build such houses will mostly do their own work; therefore the rooms are as closely connected as may be, generally opening directly into each other.

From the very nature of the case, compactness and economy were studied as closely as possible. And while a pleasing exterior was kept constantly in view, equal care was taken not to sacrifice comfort or convenience to mere show, believing, as I do, that beauty of proportion, outside or in, usually harmonizes with what is most convenient and best for us.

In the matter of cost, little that is reliable can be said. Materials and labor have such widely different values in the various parts of the country that what might be correct in one section would only mislead in another. A way that we often see recommended is probably as good as any—that is, compare what you intend to build with the cost of some new house of about the same size and style of finish in your own neighborhood.

With these remarks I submit the following designs to the judgment of that class for whom they are intended, hoping they may be fortunate enough to find something in them that will be a real help in planning homes for themselves.

Design I—Dwelling with Wings.

[View at head of this article.]

This plan needs little explanation. We go down cellar from the pantry, which is large enough to admit of a meal chest in the corner, or what is preferred by some, a closet 2½ feet high by 1 foot 9 inches in depth, in the clear, with broad kneading-board hung on hinges for top. In this is a barrel of flour, and all the necessary aids to baking on narrower shelves close above. In this and some other plans the living-room is at the rear. This being the apartment most occupied by the family, every means should be used to make it pleasant. *Sunshine*, especially in winter, adds greatly to the cheer-

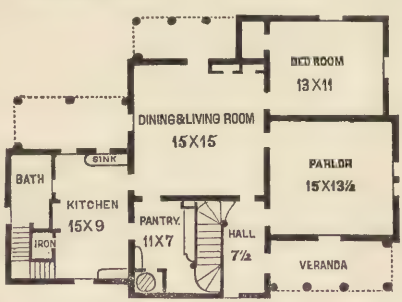


Fig. 52—Design I.—*First Floor.*

fulness of a home room; but houses often front northward, with nothing but a common highway in the foreground, while a beautiful view may open out from the rear.

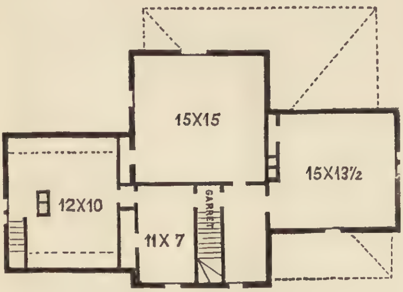


Fig. 53—DESIGN I.—*Second Floor.*

These designs with living-rooms back are intended for such situations. The width and height of the verandas can be so managed as to keep out most of the sunshine in summer; while the sun, running lower in winter, will pour in his then welcome beams, streaking the carpet with gold, and lighting up the wood-work and furniture. How immeasurably better will a meal look and taste in such a room!

The upper half of door opening from this room to the veranda should be glass. If preferred, of course, this veranda can be omitted, and a window take the door's place.

As small kitchens have been mentioned, it may be as well to say that the intention in these plans is to have them *too* small for setting a table, and if there is any probability of undertaking such a thing, they should be still smaller. If there is any one thing better calculated than another to weaken digestion, mar the pleasure of eating, grate upon delicate nerves, and harrow up the feelings generally of persons of some degree of culture and refinement, it is to sit down to meals in a room impregnated with the odors of cooking, with stove close at hand containing steaming pots and boilers of turnip, cabbage or potato water, and the greasy liquid in which meat or fish was cooked; on the other side perhaps a shelf or sink, containing the endless list that will accumulate in cooking, of dirty dishes, pans, spiders, skillets, griddle greasers, and what not, that in the hurry to have the meal at the exact minute, must be tossed into the nearest catch-all. Oh, what a place for that social and intellectual feast—that warm commingling of the feelings and affections which in some families can occur only at meal time, as then only will all the members be together—even family worship will probably be conducted here! Is this picture too strong? "*You* don't have things so." Perhaps not. But others must admit, at least to themselves, that it may be even worse. Ask teachers who have "boarded round" their experience.

I am aware of the partiality for large kitchens, or rather combinations of kitchen and dining-room, and the many arguments brought in their favor. But cannot all that is claimed for them, ease of doing the work included, be found in the present arrangement of dividing this great room into a moderate sized dining-room and small cook-room? Observe how con-

venient everything is to the dining-room, and imagine the table set on the left as near as possible to pantry and kitchen doors. After meals the table can be cleared in a moment, and all removed out of sight. Then how delightful the thought that when weary of washing, ironing or baking, by a step or so you can retreat to this bright and pleasant room, with its cool, refreshing atmosphere, where simply to look around you is to rest! With proper care to ventilate these small kitchens by opposite windows, &c., there need be no more inconvenience from heat in summer—indeed, with the cool retreat above mentioned, not so much as in the larger rooms; and that great drawback to health and comfort, eating in heated rooms in summer, is avoided.

Above all, that nuisance, that blot on home scenery, the "shanty," "lean-to," or "summer kitchen" is not needed. This disagreeable adjunct to so many houses, which seems to have been sown broadcast over our land, is the very best argument for small kitchens. The necessity for this shabby substitute should say to us, in language too plain to be misunderstood, plan your little kitchen *in the first place;* study it well; indeed, give it and the adjoining living-room, closets, &c., more careful thought than any other part of the dwelling.

It might have been added, while speaking of living-rooms, that a pair of upper cupboard doors could take the place of door leading to pantry, with drawers or lower cupboard doors and broad shelves over, inside the pantry. This arrangement allows the rapid passage of dishes, &c., to and from the living-room.

Design II—Compact Square Dwelling.

The ground plan of this design is so nearly square that those who prefer the four-sided or square roof can adopt it. I must confess however to a

Fig. 54.—Design II.

strong objection to such a roof on a house fairly in the country. It seems to look well enough in town or suburb, but the upper horizontal line of the span roof, with its handsome gables, will generally afford the beholder most pleasure, and appears to harmonize best with country scenery. There is

also a practical reason for it worth considering. The good housewife prizes a fine, open garret for many purposes. Not the least of these is having a place for drying clothes in cold or stormy weather, where they can hang regardless of thieves or sudden rain, until she is ready to iron them. This is a principal reason why at least one wing of some of the other designs is carried up two stories when good proportion in so narrow a building seems to require less height. The roofs also are pretty steep, allowing snow and rain to slip off easily, making the roof more durable, beside giving better head room.

This also is rather in violation of what is usually taught in architectural works, for there we are apt to find the flattest roofs on two-story houses. The idea appears to be that the house with steep roof, being actually higher, must necessarily *appear* so. This I believe to be a mistake, at least on rather narrow buildings. Having given particular attention to the subject for some time past, and made many comparisons, it is found that houses with flattish roofs invariably look higher than their steeper roofed neighbors. It would appear that we judge mainly by apparent height of the sides, or distance from side eaves to the ground. Now the steep roof—with modern or wide projection—shuts down over the sides and, as it were, covers up or absorbs a portion of this side height into itself, and we lose sight of it in the impression made upon the mind.

Whether this can be adopted as a principle or not, it is a great pity for the good of the roof and all beneath it, that some noted authority has not long ago laid down the rule that no shingle roof shall have less than 30° or one-third pitch.

The above remarks do not apply so much to this design, as it is wide enough for its height, and a one-third roof would probably look well upon it.

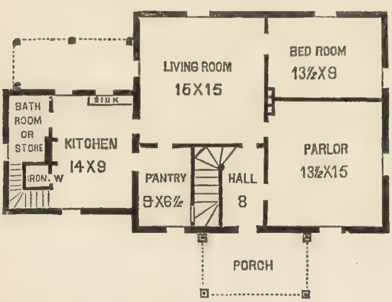


Fig. 55—Design II.—*Principal Floor.*

As a dry, well ventilated cellar under the main building is deemed of great importance on many accounts, but especially on the score of health, an easy, safe and comfortable way of reaching it becomes a matter of consequence. No better place could be desired than under the front stairs. The inside or closed stairway affords special facilities for this purpose, as it can be shifted and changed in various ways to suit the peculiar circumstances of each case; and with a little calculation the cellar door can always be in the pantry or kitchen, and that abomination, a cellar door in a living-room or hall, may be avoided, as

well as the cramped holes down which people sometimes squeeze themselves, who have a cellar only under a wing. In most of these plans the passage to the cellar is in the pantry, our own folks, and others who were consulted, preferring it there.

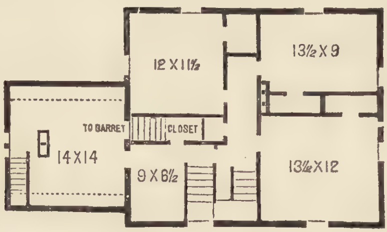


Fig. 56—Design II.—*Second Floor.*

For convenience it is better to partition a cellar into several rooms, allowing fruit to be shut off by itself and kept very cold. A 4-inch brick wall is sufficient. In building our own cellar wall, (which is stone,) a little before reaching the surface of the ground it was reduced in thickness 4 inches, forming a 4-inch shelf all around the inside. This was leveled by one course of brick flat; then with good hard brick on edge built clear up to the floor, making a 2-inch hollow between stone and brick. Great pains were taken to fill the joints perfectly, and no frost finds its way across that little space of dead air. Occasionally a half brick was run back to the stone to strengthen it. With such precautions no unsightly banking up is needed in winter, even an 8-inch *hollow* brick wall answering the purpose.

Design III—An Irregular Dwelling.*

The parlor bed-room is a favorite arrangement with some; such may be suited with this plan. The parlor itself is a very snug, pleasant room, with its windows reaching nearly to the floor, and both looking out on pretty verandas. The living-room too is supposed to be on the sunny side, and the door from it to veranda back of parlor should have the upper panels of glass, that its occupants may have in view plants and flowers on the veranda. This veranda or porch is intended to be so constructed that sash may be used in cold weather, to be laid away late in spring, making an open piazza of it in summer. Connected with our house is a porch of the kind known as the "glass porch," which we like so well that whenever building again is talked over, the glass porch is at once thought of as one of the most delightful appendages. It is an excellent place to forward a few tomatoes, egg plants or peppers; early blooming pot plants also find in it a congenial home, and chrysanthemums and other late bloomers will flourish till Christmas. As a children's play room in cool weather it is invaluable—out of doors "with the chill taken off." In ours several things that need to be very handy, yet would occupy valuable space and cause litter in the living-room, find an appropriate place. Important among these is the wood-box, and a trunk containing articles cut out and those that need mending, with rolls of various kinds of cloth, &c. Packages of

*The general appearance, height of roof, &c., in this design are similar to those of Design I.

old agricultural and horticultural papers, brought from their resting-place in the garret, to be looked over, winter evenings, are piled on the plant table. All these can be reached in a moment without admitting cold; indeed when the sun shines the porch is often as warm as the living-room.

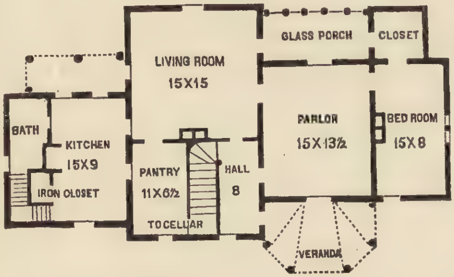


Fig. 57—Design III.—*First Floor.*

In fact so various are its uses, beside the all-important one of a warm and cheerful entrance porch, that fully to realize its value it is necessary to have and use one for years.

If thought of and carefully planned beforehand, its cost need not be much. Set the posts to fit the sash; board up tight about 2 feet from the floor, and down some from the top; hang a door, put in the sash, and if the sun shines, you will find yourself in a warm place while looking around to see what further may be needed. Of course the floor should be one step down, as usual, to prevent litter inside.

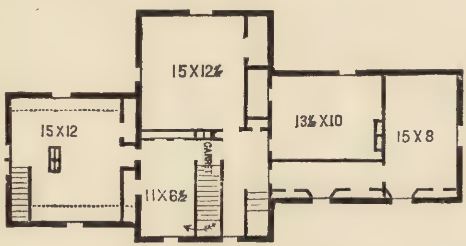


Fig. 58—Design III.—*Second Floor.*

An outside door was thought desirable to a bed-room situated as in this plan. The room used for entry to the bed-room will also answer for closet or bath-room.

A shoe closet, where the men's shoes, boots, slippers and boot-jack can be kept, is very desirable. A small one will answer, and better take it right out of the corner of the room than have boots and shoes throwing around under tables, in corners, &c. It is very nice for the women, and for weary men when they come in at noon or night, to draw off their coarse boots, set them back in such a closet, and step into a soft pair of slippers that are on a shelf within easy reach. Men should understand too that the economy of wearing slippers in the house is not altogether in the labor saved to the women, the wear of carpets, or the rest and comfort to them-

selves—as it is found that a *thin* sole wears better on a floor than a thick one; besides, the first cost of slippers is less than of boots.

Design IV—A Small, Compact House.

Imagine the kitchen wing detached from No. 1 and we have in the elevation of that design a resemblance to No. 4. In the interior the closed stairway is adopted; and a space 15 by 6½ feet containing closet and pantry, and stairs to upper story and cellar, afford a good illustration of what has been said of the economy of this mode. The peculiar feature of this plan is in placing the pantry between the kitchen and living-room, an arrangement highly commended by some who have tried it. It certainly has some points to recommend it, especially in connection with small kitchens. If, as before suggested, we regard the dining-room, pantry and kitchen merely as parts of one great work and living-room, so divided as to put the rougher and more disagreeable work in the background, and otherwise contribute to the comfort and convenience of the housekeeper, then assuredly a pantry so situated will harmonize with the general design. To realize this, step into the pantry a moment. Do you wish to look after the roast, or to see if the bread and pies are browning nicely? It is but a step to the kitchen. Does pleasure call or business demand your attention the other way? It is no further to the living-room. Are yon in want of potatoes, milk or butter from the cellar? The door is at hand. Even a barrel of flour and fixtures for bread making, &c., may be within reach by opening a passage to the closet and closing the door to it from the living-room. Supposing, as recommended for the last plan, that the porch will be enclosed with glass in winter, the pantry window is placed under it, effectually preventing the entrance of frost; also shading the window in summer.

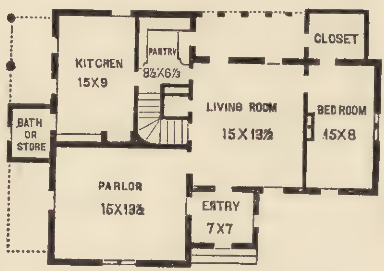


Fig. 59—Design IV.—*First Floor.*

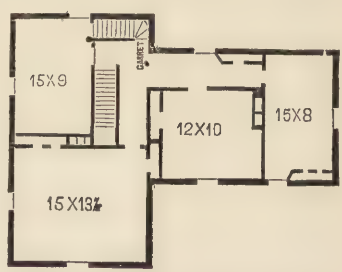


Fig. 60—Design IV.—*Chamber Plan.*

The size of rooms in these plans is intended to be in the clear. In most

cases carpets will fit them both ways. Several of them, parlors in particular, are 15 by 13½ feet, this size being suited to yard-wide carpet one way, and Brussels or other carpet three-quarters wide the other. By being very exact in planning to make right allowance for studs, lath and plaster, base-board, &c., much waste, worry and labor in cutting, fitting and turning under of carpets may be avoided.

No plans for woodsheds are given with any of these designs, because many prefer them detached from the dwelling, on account of dirt, noise, fleas, danger from fire, &c. Those who like it better can easily find a way to attach one to most of them. It is a very simple matter to build a detached wood-house. For 12 or 16 feet wide, and any desired length, run a 5 or 6-inch scantling around the bottom for sills, and a 4-inch one around the top for plates and to nail to; nail on inch boards 8 or 10 feet long, which serve as posts, and need no battens; put a few boards across for ties, nailing to foot of rafters, and finish by putting on the roof. No underpinning is needed—simply some blocks or brick, as the air should pass under freely. If there are any fears of getting out of shape, nail boards inside at the corners, reaching up from sill to plate, diagonally, for braces.

Design V—A Small, Complete Dwelling.

Who has not had, some time or other in life, visions of the beauty and elegance of the entrance hall, with its open stairway, expensive newel post,

Fig. 61—Design V.

polished hand-rail and balusters, with space for hat-rack, table and clock, and it may be to set a lounge or sofa? Perhaps there is nothing for which we would sacrifice more to secure in our dwellings than this luxury, I must call it, for all that is really useful about it may be had in an enclosed porch or vestibule, at comparatively small expense. In our anxiety for this much coveted arrangement, we too often overlook its disadvantages, or do not reflect that the cost of properly fitting it up might build a wood or hen-house, or half carpet our dwelling; or that what in the expensive mansion would be very proper and pleasant, with hall stove or furnace register pouring in its genial warmth, may be quite out of place, and decidedly cold and uncomfortable, in a cottage. It would be difficult to contrive a better device to chill the second story of a small house. Open the front door, and every

room and passage above will feel it in a moment. So, desirable as the hall with open stairway may be in the rich man's villa, let us remember that in these cheaper designs we started with the idea that compactness and economy must be observed. The inclosed stairway has therefore been adopted in some of them, and hard as it may be to accept, it can be shown that it has its compensations. Not the least of these is that in the many necessary journeys to the upper story in the course of the day, you always start from a warm room, and when the weary or invalid wife or daughter ascends, the pleasant atmosphere of the living-room seems to accompany her. So too when bed-time arrives, no cold hall is to be passed, and the stair door being close at hand, many steps will be saved. The greatest care should be taken to make the stairs easy and comfortable in all respects. They should be well lighted from above, and have room enough for a hand-rail, which should not be omitted, as it need cost but little here, and adds greatly to ease of ascent and good appearance.

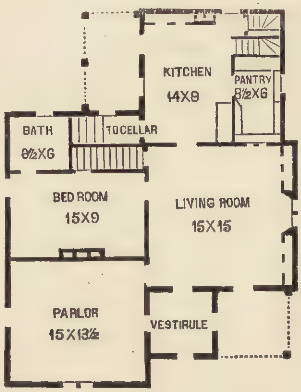


Fig. 62—Design V.—*First Floor.*

This suggests how much appearance has to do even in so simple a matter as climbing stairs. Who has not felt discouraged when standing at the foot of a long, straight flight of steps, looking up at that top which must be reached, however tedious and difficult the way may appear?

Put in a landing half or two-thirds up, and a turn in some other direction, and all is changed. The distant goal is hid, and, as in the journey of life, not seeing very far ahead, we start with confidence, rest a moment perhaps, or change the motion at the turn and reach the top as it were by two efforts, neither of which has been fatiguing. I speak with the more confidence of this matter, as the house we have occupied for years has such a landing, and the ease with which we reach the rooms above is still cause

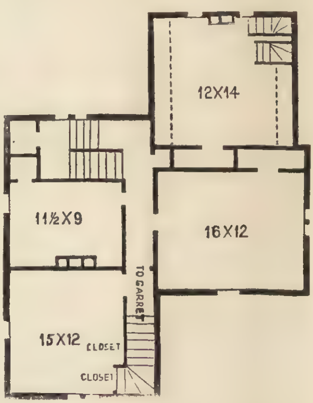


Fig. 63—Design V.—*Second Floor.*

of congratulation, especially after a recent experience in climbing a straight flight. Probably as good proportion as any for steps is $7\frac{1}{2}$ inch riser and 10 inch step. Make the top of second floor exactly 10 feet above the upper side of lower floor, and fifteen of these steps or sixteen risers will land you all right. It is important to make this close calculation before laying the joists, as a single step differing from the rest in height, if only by the fraction of an inch, is exceedingly annoying, and many a serious bruise has been brought about in this way, with perhaps not a suspicion of the cause.

This design mainly explains itself. The window at right of cellar stairs, though like the other outside, is really a cellar window. There is a space under the foot of front stairs, on the left as you descend to the cellar, which is about as useful as any closet in the house; many things can be shoved in without stooping, but it is especially good for boots and shoes not needed every day, as a slightly damp air prevents their becoming stiff and dry.

Design VI—Oblique Dwelling.

This design* is intended for a diagonal road, or one that runs say nearly northeast and southwest, or southeast and northwest. Suppose, for illustration, that it is on the southeast side of a road running about southwest; then, to face the highway, the house will front northwest, and the front or door side of vestibule will be parallel with the road, and, of course, the house will stand with the cardinal points one end to the north, the other to the west. It will not only look well in this position, but it is hoped it may in some degree meet the wants of that numerous class who wish to have all straight with the world. This sentiment, whether natural or acquired, is often very strong, so much so in some cases as to make its possessor really uncomfortable in a house not standing with the points of compass. On the contrary, however, in one that does so stand they find many things that add to their enjoyment. To the point is the pleasure experienced in having the sunlight

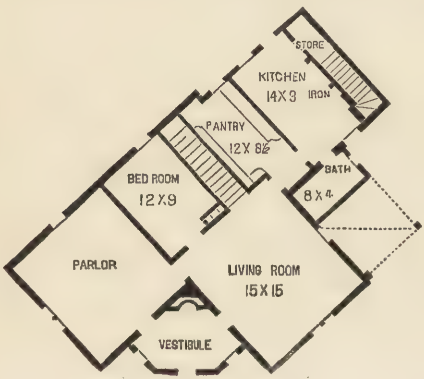


Fig. 64—Design VI.—*First Floor.*

*This design may have two gables fronting at right angles, as shown in Design V, but not quite so high, so as to present more of a cottage appearance, say $1\frac{1}{2}$ or $1\frac{3}{4}$ stories.

that comes in at noon straight with the stripes of the carpet, or the shadow of a column or post at the same hour follow a crack in the veranda floor; also the comfortable feeling experienced in viewing a fine sunset straight off from a west window, or the moon rising in all her glory, as seen from the opposite side. Of the same character is the satisfaction of the weather-wise, when on first going out in the morning he learns the direction of the wind by comparing the way the smoke blows with the upper line of the roof; or to come to more physical wants, the joy that lights up the face of him who is laboring in the distant field or wood-lot when on stepping to the line between him and his neighbor he finds, on looking up, that the sun ranges exactly with the north and south fence, and, of course, dinner is ready. So we will step inside.

Fig. 65—Design VI.—*Second Floor.*

The inner corner of vestibule may have a corner cupboard for various uses, a hat-rack can occupy another corner, and a small, three-cornered table, with shelves above, the third. The parlor stovepipe can go through to a drum in the bed-room, thence to chamber above and into the chimney, thus warming and partly warming three rooms; or, if preferred, a chimney can be built between the parlor and bed-room. The living-room stovepipe may also ascend to the chamber overhead, across the passage and into the chimney, high enough to pass under. The door to porch back of living-room may be partly glass. The cupboard doors in living-room should be glass, and the cupboards finished alike; one is intended for books; the other would be nice for best dishes, &c. The pantry is conveniently situated for both kitchen and living-room; it will be advisable to finish it, or a portion of it, lower than the rest of the house, as to reach the second story a few return steps are necessary over it. It may be well here to call attention to the fact that some women prefer a pantry so finished, although inconvenient and tiresome to most. There is no use in denying that the pantry, as usually managed, is about the worst place in the house for flies. By having the ceiling but little higher than the top of the door and window, the flies are easily driven out, the cobwebs readily brushed down, and with the help of thorough ventilation all can be kept clean and sweet.

Don't fail to have good ventilating flues in both pantry and bath-

room, to be kept always open in summer, but so arranged that they can be easily closed in very cold weather. Probably no other rooms in the house so much need this care.

In outside finish and proportion, care should be used to give this house a cottage-like appearance, and that it shall not look too high; the second story is only about 6 feet at the sides, and 9 feet in the middle—kitchen wing 3 feet at sides, all to be covered with half pitch roof; the front wings to be of same height and finished alike. The outside cellar door is upright and under the same roof as the back piazza—this being found much better in wet or snowy weather than the usual way of double doors nearly level with the ground.

Design VII—Compact Irregular House.

In the original drawing of this design the living-room occupied the place of the parlor, and the kitchen and pantry were in a wing where the bed-room now is. Of course this put the parlor and bed-room in place of the present living-room and kitchen, with the bath-room where it now is, and

Fig. 66—Design VII.—*Principal Floor.*

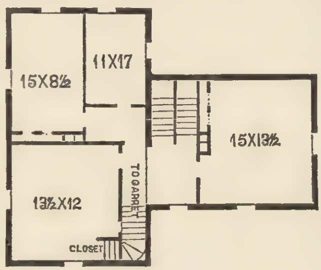


Fig. 67—Design VII.—*Second Floor.*

a large closet in place of part of the pantry. The present location of kitchen and pantry was suggested by my wife. It is certainly a very happy arrangement, combining many advantages. The cook-stove, though around a corner, and out of sight from the living-room door, is yet as handy, both to that and pantry, as it is possible to have it. Sink, iron closet, shoe closet, ironing table, &c., may be placed to suit the convenience of the occupants. The chimney being tall, the cook-stove cannot smoke. A flue for ventilation should be carried up between the kitchen and living-room flues, where, being always warm, it must have a strong draught, and will carry off much heat and steam. Another help toward keeping the kitchen cool in summer is to put the stovepipe immediately up the chimney, through the high, open fireplace, which is to be closed in winter with a zinc fireboard, and have the stovepipe ascend to chamber overhead, which will then be the

warmest sleeping-room in the house. Those not wishing the stove clear back in summer can still carry the pipe up the chimney with the help of a curved pipe at the bottom. With these precautions, and the windows carefully placed in reference to cross draft, the kitchen can be kept very comfortable in the warmest weather, and with ordinary care in keeping the doors shut, little heat need reach the living-room. In place of common door between living-room and pantry are cupboard doors on living-room side, reaching within 3 feet of the floor, which when thrown open expose about four broad shelves. Here anything and everything needed *in* or *out* of the living-room can be rapidly passed. The pantry is lighted through the bath-room by glass through which we cannot see, but which admits the light freely. The bath-room is well situated, and while it affords a back passage from the bed-room, is handy to water and easily warmed from the kitchen fire. A fine closet is taken out of the back end of the hall, under the head of the stairs. It is reached from a broad step at the top of the cellar stairs, and may contain a barrel of flour, or be used for other purposes. On the left as you enter the pantry, is a broad kneading shelf, well lighted from above, and at the opposite end, under the shelves, may be drawers or cupboard. The hall being only 6 feet wide, and the parlor and living-room doors opposite, the two rooms are brought as near together as possible and have a hall between. The porch back of parlor, and door leading to it, can be omitted if not desirable. A stovepipe hole can be made from bed-room to parlor, to be used if ever needed.

It will be seen that this is a favorite plan, and if care is used not to carry the building too high, it can be made to *look* as good as it is. One of the best signs of architectural improvement and progress, in a common sense direction, is that so much less is said recently in favor of the high ceilings so fashionable a few years since. Occasionally even a timid advocate of what he calls "the *low*, comfortable rooms of old-fashioned houses," may be found. Far more plenty, however, are those who continue to value a house by the height of its rooms. If such better understood the principles of heating and ventilating dwellings, they would know that a room 9 or 10 feet high may have an atmosphere equally pure, and even pleasanter, at much less expense, than one of those lofty apartments, in which a common kind of person feels as though he were out-of-doors, the ceiling is so far above him. Nine to 9½ feet for lower, and 8 to 8½ feet for upper story, is probably high enough for these small houses.

DESIGN VIII—THE HOUSE IN WHICH WE BEGAN LIFE.

This cottage is introduced not so much for any special merit in the plan as to show the method of construction. It was built in November, 1851, and we moved in, Dec. 6th, before it was plastered. The underpinning of stone, about two feet high, is placed directly on the surface—being gravelly, no damage has occurred from frost. A shelf about 18 inches wide is left all around between the bottom of this wall and top of cellar wall proper.

This cellar wall is only 4 inch, brick, bottom of cellar and shelf at top of wall cemented. Where brick is not to be had, or is very dear, by sloping the sides a little the whole may be cemented. A column of brick or wood marked *c*, (fig. 69,) supports cross timber, and is directly under chimney. Sills 6 by 8 inches, laid on in fresh mortar; plates 4 inches. A light post is set up at each end of cross partition, to which is secured the 4-inch girt or cross-tie over partition; also the plates. No other posts are used, and these can be dispensed with. Joists run lengthwise of the house, and, of course, may be very short. The outside ones being spiked to the plates when the floor is nailed down, no spreading can occur. As the house is only one story, it would have been much easier to lay the upper floor before putting on the roof.

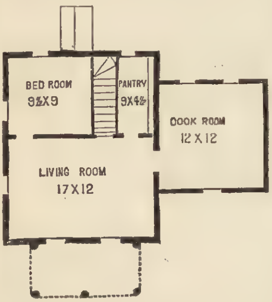


Fig. 68—Design VIII.—*First Floor.*

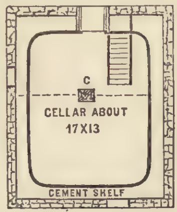


Fig. 69.—*Basement.*

The building is sided with unplaned plank 12 inches wide and 1¼ inches in thickness, battened outside and in with 1 inch thick battens. The weather becoming intensely cold, with high winds, immediately after we moved in, it became next to impossible to plaster, and as the best substitute to be thought of, we covered the walls with cheap wall paper. This shut out the wind effectually, and looked very well with its up and down vine, and the projections made by the battens. The next fall it was lathed on the battens, and our pretty paper hidden by good two-coat work, giving a house that was thought warmer than any other frame dwelling in the neighborhood. Much of this warmth is undoubtedly due to the inside lining of paper, making dead air space between it and the plaster, which of course greatly obstructs the passage of heat.

This cottage is still in good repair, and is considered very comfortable and pleasant. The cost in those cheap times might have been, as near as now recollected, about $125. This was exclusive of veranda and cellar wall, which were not added till some time after; also the bed-rooms above, which were not finished at first. The cook-room, which was not plastered, was used for wood in winter. The chimney started above and needed but few brick.

In the construction of such a cottage it is no doubt difficult for some to understand that each plank spiked on, as in this case, becomes itself a *post*, capable of supporting a great weight. The mechanics who assisted in building ours were of opinion when done that it might be rolled half a mile without coming to pieces.

A Substantial Farm-House.*

A few years since we had occasion to erect two small farm houses, which answer the purpose well, are comfortable in winter, furnish good cellars,

Fig. 70.—*View of House.*

and the roofs are perfectly free from all leakages. Fig. 70 is a view of one of these houses, and shows its external appearance. The cellar is under the principal portion, the walls of well built masonry 7 feet high, and with good drainage under them all around, connected with a ditch with tubular tile to carry off the water. The house itself is made of wood, unplaned, the plank siding being set vertical, and battened both inside and outside. The inner battening, made of pieces 2 by 3 inches, serves as a studding on which the lath is nailed. These two series of battens, with the plank, give a perfect covering by effectually closing the joints, so that no air can enter, the nailing being frequent and thorough ; and the space of air between the plank and lathing imparts additional protection against cold in winter. Although one of these stands in a very windy place, the inmates say they did not suffer in the slightest degree from the severest weather—less than in any other house they had tried. It is probable that this siding would sufficiently brace the building from any distortion, but the carpenter thought it safer to insert long braces of 2-inch plank against the inner face of the siding, and on these braces the ends of the interior battens rested.

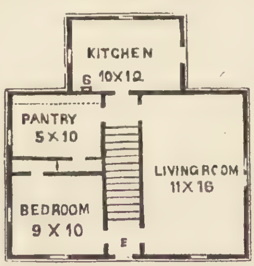


Fig. 71.—*Plan of Principal Floor.*

Fig. 71 represents the plan of this house, and needs little explanation. The main building is 16 by 24 feet, and the kitchen wing is 12 feet square—represented by mistake in the cut 10 by 12 feet. The plan is very compact, entrance being had from the front door through the small entry to the living-room on the right, and to

* This plan, and the one following it, are from the COUNTRY GENTLEMAN.

tbe bed-room on the left. The space between the bed-room and pantry furnishes a closet opening into each. Between the kitchen and pantry is a door 20 inches square, (marked S,) breast high, through which dishes are passed without the trouble of going through the common door. From the entry between them is the passage down stairs, under the stairs which are shown in the cut.

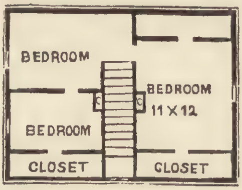


Fig. 72.—*Chamber Floor.*

Fig. 72 is the second story, and explains itself. The chimneys do not run down to the first floor, bnt are entered by stove-pipes passing through the chamber floor, and by elbows in the chamber rooms, thus giving more space below, and imparting some warmth above.

A More Expensive House.

A correspondent offers this design of a country mansion. So small a drawing cannot do justice to the design, but perhaps enough can be

Fig. 73.—*Perspective View.*

gathered from it to show that such a house should be built of brick or stone, or if of wood, only in the most solid and thorough manner.

The ground plan can be modified somewhat by making the front of the library on a line with the hall, and extending the arcade into a veranda along the new front. This would make a plain house with the single parlor ell, and would make the library a room only 10 by 15 feet in size.

Such a dwelling as this, before the advance in cost of material and labor, occasioned by the war, could probably have been built of wood

very plainly and economically, for about $2,500, and of brick for from $5,000 to $10,000, according to economy or elegance of finish, and allow-

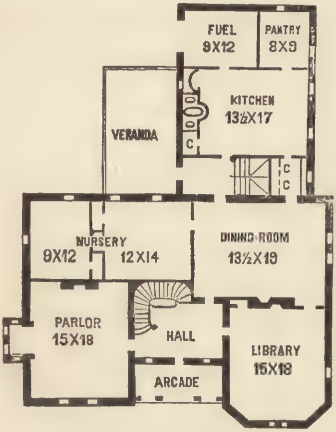


Fig. 74.—*Principal Floor.*

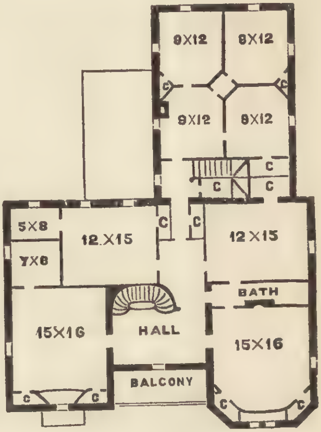


Fig. 75.—*Chambers.*

ing at the latter figure for some increase in size, to give more spacious apartments.

CLOSETS AND VAULTS.

EVERY COUNTRY RESIDENT should see that there is no place on his whole premises that emits a bad odor; the kitchen, out-houses and all the barn buildings should be kept in perfect order, and with breezes of pure, health-promoting air from every part. This is the way for him to keep his family free from disease, and to make country life attractive. We have seen places where every foot of the back yard was as perfect a specimen of neatness and purity as the best of the front grounds; and on the other hand we have been compelled to pass over some other places where we felt inclined to close both nostrils and eyes as soon as we passed beyond the reach of that part of the premises kept for show. It is not difficult to preserve the premises in proper order—not so difficult as to allow them to become foul and repulsive—if the work is gone about in the right way, and systematically attended to, it becomes easy, simple and satisfactory. It is only when by neglect vast heaps of dirt are allowed to accumulate, that clearing out and brushing up appears formidable.

There are few farmers who can have the conveniences and means for water-closets. But they have plenty of materials at hand for arrangements

quite as good, or even better, never getting out of order, and costing very little in comparison. There are two materials, one or the other of which is always readily to be had, that applied daily will render vaults quite inodorous. These are coal ashes and road-dust. A quart or two of the former, or a pint or two of the latter, thrown down regularly once a day—or better, twice a day—will accomplish all that is desired. The ashes are driest, and the road-dust the best absorbent, and the two mixed together constitute the best material, combining the advantages of both. But either will do well alone.

If this application of the absorbent is properly attended to—and it need not take ten seconds in the twenty-four hours, if the ashes or road-dust be placed in an accessible reservoir—the closets will not only have a pure air, but the contents of the vault may be shoveled out as readily and with as little annoyance as the same quantity of sand. We never had a hired man that made the least objection to it. The removal of the deposits need not be made oftener than two or three times a year. To accomplish this work easily, the vaults should be so made that they may be kept shut closely at all other times, and yet perfectly accessible when the contents are to be drawn away. (Their value for manure will be readily understood.)

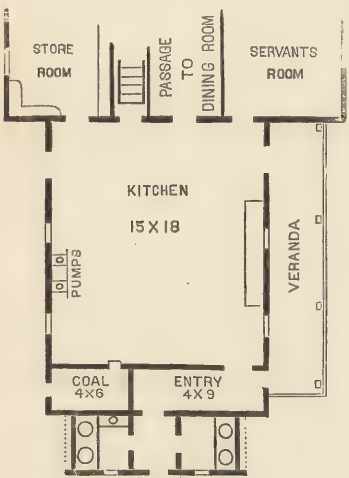


Fig. 76.

There are various plans or contrivances for this purpose, a few of which we shall proceed to describe. The first is one which we have adopted and found quite convenient; and in order to show the whole arrangement, we represent in the plan the kitchen to which it is attached (fig. 76.) We may remark at the outset, that the same system of cleanliness is insisted on in this kitchen as should pervade every other part of the house—that the floor is of oiled white-ash, the wood-work grained, the walls papered, and the windows furnished with green blinds. A veranda passes along its length on the side from prevailing winds, and either this or the kitchen may be passed through to the closets, or a door entered from the outside. The three modes of ingress and egress, and the two apartments from the central entry, render the accommodations sufficient for an ordinary family. Another out-door closet stands among the trees, in a secluded place, and a third, accessible to hired

men, nearer the barn. The closets which we have figured in the accompanying plan (fig. 76) are made by an addition placed at the end of the kitchen wing, 5½ feet wide and 14 feet long, neatly finished, and with hip roof, (fig. 77.) The apartments themselves are handsomely painted and papered, and are kept as neat and with as pure air as a parlor. It is easier to maintain them in this condition than in any other—the attention becoming a habit, the labor merely nominal. A wall is built the

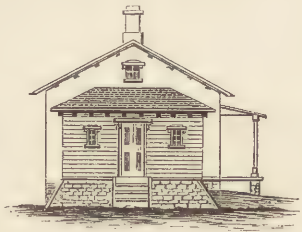


Fig. 77.

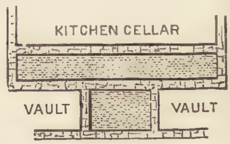


Fig. 78.

whole length of this additional building, openings being left only at the ends, (fig. 78.) The middle space is filled with earth, and the cellar wall under the kitchen is set 2 or 3 feet in, so that by no possibility can there be any communication to it. The ends of the end wall slope a little, so that the plank doors which close the vaults may always fall shut. These doors are hung on hinges above, so as to be hooked up when the vaults are emptied. They are coated with gas tar on the inside and with petroleum outside, although, as commonly used, paint would answer. When the deposits are removed, we find the most convenient way is to place a large tub (made by sawing a hogshead or large barrel into two) on a stone-boat, shovel it full, and then draw out on the garden or adjacent grounds where a rich manure is desired. This we find much more convenient than a former practice of placing a plank box (coated with coal-tar) on runners in the vault, and allowing it to stand there except when emptied.

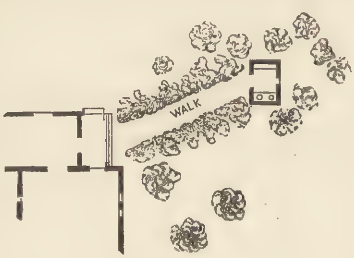


Fig. 79.

Where it may not be convenient to place the closets in immediate contact with the dwelling, as in the plan just described, the same advantages of removing all odor may be secured elsewhere. In one case the closet was placed 30 feet from the house, and the walk leading to it entirely covered by a line of arbor vitæ trees on each side, (fig. 79.) Norway spruce or hemlock would have been better, as they give green and dense foliage in the shade.

It is always best to place the building on ground which immediately slopes

or falls away from it, so that the contents may be drawn away on a level or down hill, and also for effecting free drainage. A low wall or terrace is a good position for this purpose. Fig. 80 represents the plan of such an arrangement, the vault being on a level with lower ground. If there is

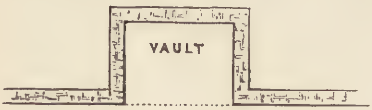


Fig. 80.

Fig. 81.

but one apartment, or if the two entrances are at the ends, with the two apartments in the middle, (fig. 81,) the recess in the wall need not be larger than about 5 feet square in the clear; but if there is a distinct and separate entry at the middle, and the apartments are at the ends, (which will be preferred by some as more convenient,) fig. 82, then the recess in the wall will be longer, or there may be two, a few feet square each (fig. 83.)

Fig. 82.

It is by no means necessary that the building be placed on a walled piece of ground; a mere slope will answer as well, provided a good wall of masonry supports the building. The recess, opening in front, allows a swing door to be placed there to enclose the vault, and only hooked up when the clearing away is done. If the walk is along the top of the bank, one close row of evergreens may be planted along the lower side, or at the foot of the terrace, and another on the upper side at several feet distance, so as to allow ample room for a passage. These trees are to be kept shortened back on the inner sides, and in time, if of hemlock or Norway spruce, will form dense walls of verdure both in winter and summer, with a green roof overhead, effectually shutting out winds and storms. If the walk does not pass along the ridge or bank, it may meet it at right angles.

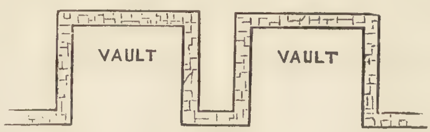


Fig. 83.

It will be found most convenient to have a bin holding several barrels of dust or coal ashes, accessible from the apartments, so that the owner can see himself daily to its application, and not trust to careless hired men, who often neglect it. If only two quarts are used daily, two bushels will last a month, and twenty-four bushels a year, but it will be better to employ two or three times as much, using it two or three times a day. The road-dust may be scraped up in large quantities from the middle of the highway during any dry time in summer or autumn. Families which employ cooking stoves that burn coal, will have from this source alone enough of the

absorbent, although it would be improved by the intermixture of road-dust. The more clay in this road-dust the better.

This is a subject of great importance that is disgracefully neglected by some farmers, who seem to make such closets as repulsive as possible; and being compelled to go through wet grass and weeds has made many a feeble person an invalid, while others have suffered serious injury in the absence of proper conveniences.

THE PROFITS OF SMALL FRUITS.

By William Parry of New-Jersey.*

SMALL FRUITS—not small in value, but so called because they are found growing on small bushes, vines and plants—were formerly considered as properly belonging to the garden, but now are grown in such large quantities as to require broad acres for their cultivation, and on some farms more land is devoted to their culture than to any other crop.

Strawberries.

The first fruits of the season, and the most healthful and delicious in cultivation, are strawberries, which are easily grown, and when sent to market in good order, command fair prices. The varieties have become so numerous that it is very difficult for one who has had no experience to determine which to plant by merely reading the descriptions of those offered for sale. After testing over one hundred kinds, I have come to the conclusion that for *profit* a very few varieties are sufficient for any one section, so as to keep up a succession from the earliest to the latest ripening. Some varieties do remarkably well in some localities, with certain treatment, while in other sections they are of but little value. The high reputation that some strawberries have obtained where the soil, climate and surrounding circumstances were all congenial, is a great recommendation in selling plants, but it does not follow that they will succeed when tried in different circumstances, which may suit some other varieties better.

Many of us well remember the high expectations with which we looked forward to the coming of that wonderful strawberry, styled "Our 700," in the possession of a prominent fruit grower in the western part of this State, not to be distributed, however, until his own stock of plants should be so large that he could afford to let them go at a moderate price.

During this time of suspense we were treated to the reports of sales in New-York of this great strawberry. "*Sixty cents a pint of ten berries each*" was very gratifying to those who expected to get some of the plants.

* The substance of this article was read before the Pennsylvania Fruit Growers' Society, and is now revised and amplified by the author for the Illustrated Annual Register.

After being informed of the moderate price of $100 per thousand, at which they could be had, and not wishing to be behind others in getting a stock of that remarkable strawberry, I ordered 7,000 plants, and set them in a 17-acre field, in which we were planting Wilson's Albany, Russell's Lady Finger, Agriculturist, Green Prolific, Cutter, Downer, French and others, any and all of which, with an equal chance, yielded better returns than the celebrated 700, which much resembled, though at that time was not known to be, the Jucunda. Yet this variety succeeds well in some localities, and proves a profitable market sort. One of my tenants, to whom I had always given all the strawberry plants he wanted, informed me that he intended sending to Pittsburg for plants of some of those large strawberries of which he had been reading in the New-York Tribune. When I informed him that I had the same kind, and he could have them without cost, he could hardly believe that mine were the same kind; said "they didn't look like those pictures in the Tribune."

Now I consider it well established that no one variety is adapted to all soils and localities. Those which I may name as having done well with us in New-Jersey, may not succeed in other sections, where some varieties do well that do not succeed with us.

But fortunately in these United States we have a great diversity of soil and climate, sufficient to accommodate every variety of strawberry in cultivation, and it can only be ascertained by trial which is the best for each.

One reason for the conflicting reports we sometimes hear in reference to strawberries, is the difference in the soil, climate, and treatment they receive.

WHAT KINDS TO PLANT.

There is probably no variety that has yielded more profit to the growers generally than Wilson's Albany. We have grown over 200 bushels per acre of them, or 6,400 quarts, which sold at an average of 10 cents per quart, giving over $600. Although not as pleasant to the taste as some others, they are good sized, firm berries, carry well and look well in market, and consequently sell well. We should bear in mind that, for *profit*, the fruits which yield well and look well are the most profitable to grow, and that the fine qualities and rich flavor of fruits are secondary considerations with salesmen who dispose of the most fruit in large quantities. If the fruit looks well on the stall, it will have a ready sale, but not otherwise.

There are a few others that have generally given good returns with us, such as Downer's Prolific, Charles Downing and Kentucky, all originated by J. S. Downer of Kentucky. Perhaps no other person has succeeded so well in raising seedling strawberries, or produced a trio of such value as these three—ripening with the earliest, and continuing through the season till after most other strawberries are gone. Three others of great value are the Green Prolific, (fig. 84,) Agriculturist and No. 30, (fig. 85,) all grown by Seth Boyden of New-Jersey. They are strong,

vigorous growers, hardy and productive—the two last named the largest berries we grow, and from their monstrous size and attractive appearance, command the highest price, having brought $1 per quart in market the past summer, when common strawberries were plenty and cheap.

In growing fruits generally for

Fig. 84.—*Green Prolific.*

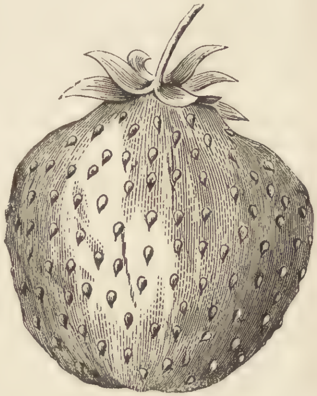


Fig. 85.—*Seth Boyden, or Boyden No.* 30.

profit it is not necessary to cultivate many varieties, but rather be confined to a few of the best that will give a succession of fruit throughout the season. I have seen plantations of from 80 to 100 acres of strawberries on single farms where there were not half a dozen varieties in cultivation. The kinds best adapted to each locality pay the largest profit. One of the proprietors informed me that he had received a check from his commission salesman of $10,000 at one time on account of his strawberries.

Time to Plant.

Strawberries should always be planted early in spring, the sooner the better after the frost leaves the ground, while it is cool and moist. Perhaps there is no greater error in strawberry culture than planting in summer time, after taking a crop of vegetables from the ground, in hope of getting a crop of berries the next summer. The ground being warm and dry, most of the plants will die; the few that survive will make a feeble growth, and it will require more care and labor the next spring to fill up vacancies and get a good stand of plants than to commence anew on a separate piece of land that has been freshly plowed on purpose to receive them.

Soil and Preparation.

Almost any ground that will bring good corn or wheat, and is well drained, either naturally or artificially, is good for strawberries. Corn that has been well tilled the year previous is an excellent preparation for them, as grass

and weeds are less troublesome after corn than most other crops. The ground should be well plowed, harrowed smooth, and marked out with a small plow the desired distance, according to the variety and mode of culture.

A very common mode is to open the furrows 5 feet apart, spread manure or compost along them, and plant *early* corn, one grain in a place, 15 inches apart, and a strawberry plant alternately between the corn. In that way the strawberries get but little culture except while dressing the corn, which, being cut for market early, usually brings from $50 to $75 per acre, and the strawberries will spread sufficiently to form good beds for fruiting the next year. Corn may be grown profitably on the same ground as strawberries, and the corn will pay for the occupancy of the ground the first season. Onions may also be grown among strawberries, and give a profit after the berries.

Another plan that has given good satisfaction with me is to open furrows 2½ feet apart, and spread a preparation of equal parts of marl, ashes and ground bone along the furrows, after it has been mixed and incorporated together for ten days or two weeks, until the heat, generated by the action of the ashes and marl, has mellowed and softened the bone so that the particles will crumble like chalk when rubbed between the thumb and fingers. Using one ton of the ground bone, and the same quantity each of ashes and marl, on 5 acres, will give a vigorous growth of dark green foliage to the strawberries.

Cultivation—Mulching.

The ground being frequently stirred with horse and cultivator close to the rows, leaves but a small portion of the ridge between the plants to be loosened with the hoe. As the runners extend and widen the beds, the cultivator is made narrower; and care being taken to pass along the alleys every time in the same direction, drawing the runners always in one way will leave them more even and regular than if drawn both ways by going back and forth in the same alley. The plants then form ridges about 18 inches wide with alleys one foot wide between them. This plan is more certain and reliable than keeping the plants in hills and cutting off the runners. There is less hand labor, most of the cultivation being done by horse-power, and if some of the plants should be destroyed by grubs or insects, there will be enough left to produce a good crop of fruit.

At the approach of cold weather or beginning of winter give them a good coat of stable manure, spread evenly all over the plants. If the rows are 2½ feet apart, a horse and each cart wheel will follow along an alley without injuring the plants. *The covering with manure is of great importance*, as it protects the buds and embryo fruit from severe freezing, and prevents the roots from lifting and heaving out as the frost leaves the ground. The rains, soaking the strength of the manure into the soil, give food and nourishment to the roots. The straw and coarser materials, being bleached and beaten close to the ground by the winter's snow and rain, do not

prevent the young growth from coming through in the spring, but serve to keep the fruit clean in summer.

Baskets for Marketing.

Crates and baskets should be ordered in time to be on hand before commencing to gather the fruit. Quarts and pints are the most suitable sizes. It will be necessary to procure at least three times as many as will be needed at any one time for picking, so as to allow for one set to be in market while the second lot is going and a third in the patch being filled. Allowing the crop to yield 2,500 quarts or 78 bushels per acre, to be gathered at six pickings of about 400 quarts each time, it will require 1,200 quart baskets, which, with crates of the best make, may be rated at about $50 per acre. But as the same baskets and crates will answer for raspberries and blackberries, and with proper care will last several years, $10 per acre is sufficient to charge each crop for the use of baskets and crates.

There are now so many varieties of baskets and boxes made that almost every grower can have his choice, but to carry fruit in the best condition they should be made of thin splints, light, strong, and well ventilated, to allow a free circulation of air to carry off the excess of heat and moisture, as the berries are not always dry and cool when put up for shipping. The splints should be so strong that the bottom tier will bear the weight of all the berries, baskets and divisions above them, or the fruit will be mashed as the sides yield to the pressure of the upper tiers of berries. Having used and tested many kinds within the last quarter of a century, I prefer the Beecher Veneer Baskets, (fig. 86,) to any others with which I am acquainted. They possess all the properties requisite for carrying fruit in good condition, are light, strong and durable, lasting several years with proper care.

Fig. 86.—*Veneer Basket.*

Picking.

There is no part of the business that requires closer attention than gathering and preparing the fruit for market. It should be assorted as picked, the prime berries put together and the cullings kept separate. The baskets should be well filled and rounded up; the berries placed close and even with stems down, so that when in the crates the divisions above will press gently upon and keep them steady in place. As the fruit grower is "no respecter of persons," but in the busy season employs men, women and children of all ages and denominations, whose object is to make the most they can, and as they are usually paid by the quart, every berry picked, whether good, bad or indifferent, will help to fill up the measure, and would be a loss to them if not put in the basket. So it requires some moral courage for the pickers themselves to put the fruit up in the best

condition for sale. To assist in this matter we provide them with baskets of a different size, in which to put the imperfect and faulty berries, so that they will measure as much as if all were mixed together.

As the berries are brought in for packing, ten or twelve baskets on a tray, they are carefully examined and at least one emptied in presence of the pickers; if they turn out all right, they are paid in white tickets; but if small, green or faulty berries are mixed among the prime ones, or they are not put up as directed, a blue ticket of less value is given, which has a salutary effect, as it is mortifying for them to receive a blue ticket, which is the signal of bad work, in the presence of others. This system works beautifully; it is a constant stimulant for right doing. It does not hurt the best hands to look after them, but is rather gratifying for them to know that their employers are aware of and appreciate their work; and work that is not well done does not receive full pay.

Yield and Profit.

There are so many circumstances connected with strawberry growing, such as varieties, soil, climate, location, markets and the skill and management of the grower, that the results of a few cases cannot be relied on as a general rule. The premium crop in Burlington Co., N. J., was at the rate of 263 bushels per acre, yielding a profit of upwards of $1,000. But one-third of that amount would be nearer our general average. For ten years past our whole crops have averaged about 2,500 quarts per acre, and averaged 12 cents per quart in market, giving the following results:

Commission, 10 per cent.,	$30.00
Picking, at 2 cents,	50.00
Interest on land,	10.00
Manure,	25.00
Use of baskets,	10.00
Cultivation, &c.,	30.00
Net profits,	145.00
Gross proceeds, 2,500 quarts, at 12 cents,	$300.00

RASPBERRIES.

The raspberry, coming next to the strawberry, is a fruit of great excellence, usually sells higher than strawberries, and is really worth more to the consumers. The fruit is heavier, richer and will go farther as a dessert. There is no waste of time and labor in preparing them for use, as the hulls are left on the bushes when picking the berries. Our markets have not generally been well supplied with raspberries, owing to the difficulty in getting hardy varieties that would stand our changing climate; most of those that succeeded well in more northern latitudes, and were highly recommended for general cultivation, would not carry their foliage through our warm summers; the canes would be injured before the approach of winter, and whether protected or not, they were of little worth in the spring.

An erroneous impression has to some extent prevailed, that raspberries which are called tender at the north may do well at the south without

protection. But raspberries do best in a cool climate, and many that succeed at the north are of no value at the south. Although some few native kinds, distinguished by their color, as red, white and black, have been grown time out of mind, it is but recently that much attention has been given to growing improved varieties.

Imported Raspberries.

For many years strong efforts were made to introduce the fine English and French varieties, and to grow seedlings from them, thinking they would be more easily acclimated, but with no better results than have followed the foreign gooseberries and grapes that have been tried in open field culture.

At this time there is no foreign variety worth growing in the open field that is generally adapted to our soil and climate. The Hornet and Antwerps are berries of superior excellence, and it is to be regretted that the localities in which they succeed are so very limited. But when all the surrounding circumstances of soil, climate and treatment are exactly congenial, they yield large crops of the finest fruit, which commands the highest price in market. A fruit grower in Camden, N. J., about three years since, had one-eighth of an acre, mostly of the Hornet raspberry, (fig. 87,) which produced 336 quarts, sold at 90 cents per quart, yielding at the rate of $2,400 per acre. The following year the crop was all taken by one dealer at 70 cents per quart. Last year when I was there to examine the plantation, which is much larger now, so that they were picking about 100 quarts daily, the owner informed me that the same person had engaged the crop again at 60 cents per quart for the season. That is the only instance in my knowledge of perfect success with the Hornet. Other plantations near by, made from the same stock, are all failures.

Fig. 87.—*Hornet Raspberry.*

Native Raspberries.

Owing to the great difficulty attending the cultivation of foreign varieties as a field crop for market, the attention of fruit growers has been turned to the improvement of our hardy, native raspberries, of which there are two distinct species. One is the *Rubus Occidentalis*, which is propagated by the top end of the canes bending over and striking root in the ground, forming a new plant, which in turn sends out shoots reaching still further from the original stock, and thus, in a migratory manner, soon spreads over a considerable space of land. The Purple Cane and Ellisdale are of this order, and the Catawissa to some extent—the White, Yellow or Golden Cap, Golden Thornless and Cream raspberries: also the different varieties of

the Black Caps, such as the Doolittle, Miami, Mammoth Cluster, Davison's Thornless, Seneca, Garden, Great Western, Hamilton, Yosemite, Ohio, Canada, and Lum's Everbearing, and many others of less value. I have not met with an English variety grown from tips, or a black raspberry grown from suckers. The Doolittle and Mammoth Cluster, (fig. 88,) are the most profitable black raspberries with which I am acquainted. The former is early, firm and carries well to market. The latter is larger and later. Both are strong, vigorous growers, hardy and very productive. Having 30 acres of them growing, I have found them to pay well, producing more bushels per acre than corn, with less care and culture, and after being once planted will continue for seven or eight years yielding annual crops without renewing.


Fig. 88.—*Mammoth Cluster.*

The other species to which allusion was made, is the *Rubus Strigosus*, an upright grower, which is increased by suekcrs from the roots, and also by planting root cuttings, but is not increased from the tips. Our native red raspberries are all of this class, and seem quite local in their habits. Many of the finest will only succeed in certain sections, where the climate and soil are just suited to their wants. It is sometimes hard to account for the conflicting reports made in reference to the same raspberry from different sections of our country. The Allen, a beautiful and delicious red raspberry, yields good crops in some localities, and from its fine appearance and excellent qualities always commands a high price; yet in other places it would not produce fruit enough to pay for the ground occupied. The Kirtland, a bright red raspberry, firm, early and very desirable for market, is highly spoken of in northern Ohio, but with me it is worthless. I have tried it on a variety of soil, from that which is moist and sandy to a rich clay loam, but in all cases the greater part of the leaves would fall off before the end of summer, the canes would be injured before winter, and they would produce but little fruit the next year.

The Franconia, Naomi, Clarke, Wauregan, Elm City, Prosser, Red Queen, Duhring, Lindsley's Fastolff Seedling, Downing, Linton and all of Dr. Brinckle's choice seedlings, the celebrated Orange, Cushing, Col. Wilder, Cope, Vice President French, Walker, Woodward and others were all affected in the same way; also the Hornet, Antwerps, Fastolff, Knevett's Giant, Northumberland Fillbasket, River's Large Fruited Monthly, Thunderer, and all other foreign varieties that I have tried, excepting the Belle de Fontenay, and that is not of much value.

Productive red raspberries being very scarce, it seemed for a while that we would have to rely on the Black Caps for a supply of fruit. Fortunately the Philadelphia, (fig. 89,) was brought into notice, which was greatly in advance of any other raspberry known. A red raspberry, as hardy and productive as a Black Cap, so easily grown, adapted to all soils and conditions in which any raspberry would grow, was a great acquisition, and it has been largely planted all over the country, producing large quantities of fruit for market, and yielding handsome profits to the growers. I have known them to produce 200 bushels per acre, and to yield at one picking $110 per acre. The Philadelphia, as a *hardy* and *productive* red raspberry, adapted to all sections of our country, is ahead of any other known variety. Yet it has not the bright color which is so attractive and pleasing to the eye, nor firmness of flesh to stand up well in market after a long journey.

Fig. 89.—*Philadelphia.*

There is room for still more improvements. If we could have a raspberry combining the good qualities of the Philadelphia, hardy and productive, with the additional ones of large size, bright red color, and firm flesh, it would be one great acquisition. There are several other hardy raspberries, though not as productive as the Philadelphia, yet brighter and handsomer, that sell higher in market. The Pearl is a bright red, medium size, handsome, firm berry, carries better and sells higher than the Philadelphia; bush dwarfish, a slow grower, with thick, tough foliage. Brandywine or Susqueco,* a large, bright scarlet berry, firm and beautiful, bears transportation well, and commands a ready sale in market. The foliage and general appearance much resemble the Pearl, from which it may be a seedling. The leaves put out a week earlier in the spring, and make a stronger growth. I have about eight acres of this sort, and expect to plant this and the Herstine hereafter. The Baker and Parnel, sent out from Cincinnati, have fruited with me, but do not promise well now. The Hudson River Antwerp succeeds only in a limited district in New-York.

Market Prices.

Raspberries sell in market according to their appearance—large sized, firm, bright red berries going at the highest figures, from which the price descends to the Black Caps, the lowest on the list.

A comparison of their prices when the market was well supplied, will show the estimation in which they are severally held. On the 7th day

* Susqueco is the Indian name for Brandywine, and the latter name is now mostly used for this variety. This sort was sent out a few years since by E. Tatnall of Wilmington, Del., under the name of Susqueco, which is still sometimes used, but not generally adopted.

of July, 1871, raspberries were sold at wholesale, in Philadelphia, as follows, viz.:

Black Cap,	5	cents per quart.
Philadelphia.	8	do.
Pearl,	16	do.
Susqueco,	30	do.
Hornet,	60	do.

From the above figures we can readily arrive at the true points of excellence for a market raspberry. It should have the size of the Hornet, color of the Pearl, and productiveness of the Philadelphia.

Fortunately we have an amateur cultivator residing in Philadelphia, who has been experimenting largely in raising seedling raspberries. By planting the Philadelphia, the most productive of all, by the side of the bright red and delicious Allen, both of which are hardy, native varieties, so that the pollen from their blossoms might become thoroughly mixed, and then raising seedlings from the berries thus impregnated, he succeeded in producing a raspberry that bears his name, combining more good qualities than any other, as large as the Hornet, bright as a Pearl, as hardy and productive as the Philadelphia, and delicious as the Allen, and properly named the Herstine (fig. 90.)

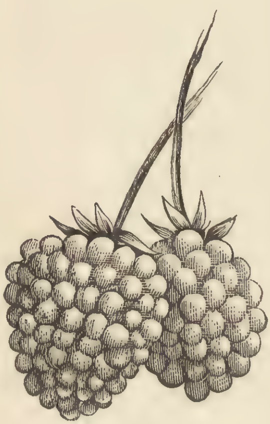


Fig. 90.—*Herstine.*

The committee of the Pennsylvania Horticultural Society, who examined them in bearing, gave the following description of the Herstine: Plant a good grower; most abundant and early bearer; suckers moderately; canes strong, of a pea green color, covered with white bloom; spines green, but not abundant; foliage healthy, of medium size, and often lobed, of a pearl gray color on the under side; fruit large oblong, with small grains and crimson color; flavor sub-acid and very good. There were several other seedlings examined by the committee, some of which were described as Ruby, Saunders and Elizabeth, having marks of great merit. They further stated that "the plants examined were entirely unprotected during the winters, without being at all injured. And should they continue on further trial to be as hardy as they certainly are productive and delicious, we have no hesitation in believing that they will fill a void in the raspberry world which has long been felt, viz.: A raspberry suitable for market purposes—combining hardiness, productiveness, firm flesh and bright color, with a delicious flavor."

I have seen them in fruit for two years, and in different soils, both light and heavy. In every situation they presented the same vigor and healthy

appearance of canes and foliage, and were heavily laden with fruit of the largest size and finest quality.

All the red raspberries were injured last winter (1871–2)—the Philadelphia more than I ever knew it to be before. Fruit sold higher this year than usual. Black Caps brought from 15 to 20 cents per quart; Brandywine, (Susqueco,) from 30 to 40 cents; Herstine, from 50 to 60 cents.

Soil and Treatment.

The management of hardy raspberries is very simple. The soil should be rich and mellow, and liberally supplied with manure and fertilizers. Ground bone and phosphates are excellent. It should be thoroughly drained. Raspberries will not succeed in wet soil.

Plow and prepare the ground as for potatoes or other crops; mark the rows 6 feet apart, and set the plants 3 feet distant in the rows, requiring about 2,500 plants to the acre. The tops should be cut down to within a few inches of the ground, that the roots may become well established before they are required to supply nourishment for long tops of green foliage. Carrots or potatoes may, with advantage, be grown between the rows the first year, after which the raspberries will require the whole space. Stir the ground frequently with horse and cultivator, to keep down grass and weeds, being careful during the warm, dry weather not to disturb the small roots feeding near the surface, by deep culture near to the plants. The old wood which has borne fruit should be removed before the following spring, and the young canes shortened to about one-third their length, so that they will stand firm and erect, bearing heavy crops of fruit without stakes, trellis or protection of any kind. The raspberries should be carefully picked in small baskets not larger than pints, better less. Both baskets and crates should be ventilated, so as to allow the circulation of air to absorb the heat and moisture, as they will bear transportation to market much better when cool and dry.

Yield and Profit.

The raspberry is liable to many casualties that will injure the crop. An excess of heat or cold, wet or drouth, and sometimes causes unexplained, will disappoint the fondest hopes of the grower.

And the price varies greatly with the quantity and quality of the fruit, so that the results of several years should be taken together to form a correct estimate. I find by a careful review, for ten years past, that all the raspberries we have sold, red and black, good, bad and indifferent, have averaged 23 cents per quart, which gives about the following result per acre:

Commissions, at 10 per cent.,	$46.00
Picking, at 3 cents per quart,	60.00
Interest on land,	10.00
Manure and use of boxes,	30.00
Cultivation, incidentals, &c.,	30.00
Net profit,	284.00
Gross sales, 2,000 quarts, at 23 cents,	$460.00

Under some circumstances much greater profits than the above are occasionally realized. But it is better to keep our views within moderate limits, and be agreeably disappointed with larger returns.

BLACKBERRIES.

Blackberry bushes, formerly considered a nuisance, are now highly appreciated and extensively cultivated, many farmers growing more acres of them than of corn and wheat together. It is somewhat remarkable that in this age of horticultural progress, there have been no seedlings raised better than those found growing wild on the commons, without care or culture. Attempts have been made to get blackberry bushes without thorns, and some have been found with canes nearly smooth, which created quite a sensation for a time, and the plants sold readily at $5 each, until it was ascertained that the fruit was as much deficient as the thorns. Various colors have been brought out, white, red and purple, which were novelties in their way, but of no practical value, in point of profit, to fruit growers. After carefully cultivating and testing twenty-six varieties, in addition to a large number of seedlings, which were no better than the parent stock, I retained four, which are all valuable as field crops for market.

Fig. 91.—*Wilson's Early Blackberry.*

At the head of the list I name Wilson's Early, (fig. 91.) The largest blackberry in cultivation, ripening early, close after raspberries, before peaches are in market, when fruit is scarce, it commands the highest price. Two years since we sold the principal part of our crop from 10 acres at 50 cents per quart, wholesale, which were afterwards sold in smaller quantities as high as $1 per quart. This variety is now extensively cultivated. One fruit-grower in West Jersey, having 75 acres of them in bearing, received the past year $20,000 for the fruit, realizing a clear profit, after deducting expenses, of $14,000, gathered within the space of three weeks' time.

Next in point of profit to the Wilson's Early, is the Dorchester, which has an upright, strong growing bush, tall, erect and perfectly hardy. For

twelve years past they have done well with me, never being injured by the winter, even when the New Rochelles were mostly destroyed. They have always yielded good crops of fair sized berries, long, shining black, sweet and firm, so as to carry well to market, and being early, they sell higher than the Kittatinny, New Rochelle, or any other late ripening blackberry which follows them. This variety is well adapted to planting in orchards of apple, cherry or peach trees; being straight, upright growers, the bushes are less in the way of cultivation than other varieties that curve out from the rows and obstruct the passages between them. The protection afforded by the trees, both in winter and summer, is beneficial.

In 1863 I planted an apple orchard, 40 feet apart each way; then a row of Early Richmond cherries each way between them, requiring three times as many cherries as apples; then a row of Dorchester blackberries in the rows of trees, and between them, which left them at the proper distance of 10 feet apart. They have all done well; the apple trees have made a fine growth and borne some fruit; the cherries and blackberries have yielded fine crops of fruit every year since old enough. The cherries ripen first and are out of the way before the blackberries commence. So that the draft upon the land is not so great as if both crops ripened at the same time. The earliest and finest Dorchester blackberries raised in our section are grown in old apple orchards.

In the spring of 1864 I sold a fruit-grower near Burlington, N. J., Dorchester blackberry plants for 2½ acres, which were set among peach trees on new land, light and sandy, from which the pine timber had been recently removed. In 1865 they commenced fruiting, yielding about enough to pay for tillage, the space between the rows being profitably occupied with tomatoes and other vegetables for market.

In 1866 they produced,	exclusive of	commissions,		$600.00
In 1867	do.	do.	do.	1,300.00
In 1868	do.	do.	do.	2,057.64
Total in three years,				$3,957.64
Deduct cost of picking,				287.64
Leaving,				$3,670.00

Clear profit above the cost of picking and commissions, or an average of $480 per acre for each of the three years in bearing. In addition to the sale of fruit, large quantities of plants were dug and sold, more than enough to pay for the original stock to commence with. This is a better average for profit than usual, and one cause for the large returns was that blackberries in many places were badly winter killed; the Dorchesters standing the cold better than other varieties, and especially when planted in orchards and protected by the trees.

The Kittatinny (fig. 92) comes next in order as a profitable berry to grow for market. It is perfectly hardy, large, luscious and very productive. And last, the New Rochelle, which has been in cultivation longer than the others, but is now superseded by them.

Blackberries are among the most profitable fruit crops; their easy culture,

hardiness, productiveness and the high price at which the fruit sells, gives them a great advantage over others requiring more expensive cultivation. They are not particular as to soil or location, but will yield well where ordinary crops will grow. It is not necessary to select the best land for a plantation, as the canes would there grow so large and rank, as to require much time and labor to trim and keep them within bounds. They need but once planting, as the bushes renew themselves annually thereafter, by sending up a spontaneous growth of young suckers to bear fruit the following year; and with an occasional dressing of manure, they will continue to give large returns for many years. I have grown on 10 acres, for several years, from 650 to 700 bushels, and one season 800 bushels, being an average of over 70 bushels per acre; while land adjoining, equally good, planted with corn, did not yield 50 bushels per acre.


Fig. 92.—*Kittatinny.*

The land should be plowed and harrowed smooth; then open furrows 8 feet apart; if muck is convenient, it is valuable to spread along them; then set the plants about 4 feet distant on the muck. The roots will mostly follow along the row to feed on the muck, and grow more vigorously than lateral or side roots. Hence, the strongest and best plants will come up along the row nearly where they are wanted to produce fruit the following year. They should not be left to stand closer together than an average of one plant to a foot in length in the rows.

The plantation should be gone over several times during the summer, and the tops of the young canes, as they appear above the bearing bushes, should be shortened in, so as to keep them at a uniform height of about 3 to 5 feet, according to their strength. This will cause the side branches to grow vigorously, and develop fruit-buds near the ground; and, interlocking with each other, the bushes will support themselves, and avoid the necessity of stakes and wires to prevent high winds from injuring them. The side branches should be shortened in the following winter or spring. Plants thus trimmed will yield more fruit, of better quality, than if left to grow tall and slender, as by nature they are inclined to do.

I have sometimes left a few rows without pruning, and others pruned but little, which fully illustrated the great importance of shortening in the branches. The unpruned bushes would bear more fruit than could be ripened on them; it would remain red a long time, and finally dry up, being of no value. The best and earliest fruit would be on the bushes well pruned, so as to throw the whole strength of the roots into fewer berries.

Price of Berries and Profit.

The average price for 10 years past of the blackberries we have sold of all kinds, has been 15 6-10ths cents per quart, which gives about the following result per acre :

Commissions, at 10 per cent.,	$31.20
Picking at 1 ½ cents per quart,	30.00
Interest on land,	10.00
Use of boxes,	10.00
Pruning, cultivating, &c.,	30.80
Net profits per acre,	200.00
Gross sales, 2,000 quarts per acre, at 15 6-10ths cents.	$312.00

Strawberries, raspberries and blackberries are usually included under the head of *small fruits*, the *profits* of which are generally good, when markets are convenient, and care is taken in the selection of varieties and in giving them proper treatment. Sometimes we hear of extravagant reports, calculated from the product of a small lot up to what a ten acre field under similar circumstances would yield. A safer rule is to take the acres and see what they have produced annually. We kept a debtor and creditor account for several years, with 22 acres in small fruits, which averaged, after deducting expenses, $272 per acre. By reference to the report of the West Jersey Fruit Growers' Association, who appointed committees to collect the returns from all the fruit growers in the neighborhood, it will be found that 776 acres of land, in strawberries, raspberries and blackberries, produced the sum of nearly $200,000, or about $250 per acre.

CRANBERRIES.

My remarks on "Profits of Small Fruits" would not be complete without referring to the cultivation of Cranberries, which is a very profitable branch of small fruit culture, where the soil is adapted to their growth, and must eventually assume proportions and importance scarcely second to any other fruit crop grown in the State of New-Jersey. We have thousands of acres unavailable for other purposes, but specially adapted to producing cranberries. Low, marshy lands and old ponds that can be drained and flooded again at pleasure, which in their natural state would not be valued at more than $10 to $20 per acre, after being cleared and planted, will often yield $200 to $300 per acre in cranberries annually, and sometimes more.

A fruit grower in Burlington County, New-Jersey, recently cleared up and planted 20 acres of moist land, which five years since was valued at $5 per acre. Last year he had two acres in full bearing and 18 acres only 2 years old, and realized from the cranberries grown there a net profit of $3,200. Another farmer and his sons residing near by, have 200 acres planted with cranberries, about one-third of which are in fruiting age, and yielded last year 3,300 bushels of fruit worth over $13,000, six acres of which averaged 100 bushels per acre, and were sold at $4 per bushel. Another farmer in the same county, in 1869, had 24 acres in fruiting—6½ acres in the tenth year of bearing, and 17½ acres in the first year of good bearing—which

yielded 2,692 bushels of cranberries, and sold at $3.50 per bushel, bringing $9,422; and after deducting $2,222 for expenses, taxes, superintendence and commissions, left a net profit of $7,200 on 24 acres, averaging $300 per acre. The 6½ acres in the prime of bearing yielded more bushels of fruit than the 17½ acres just commencing.

The Forge Company, near West Creek, in Ocean Co., N. J., have about 100 acres planted, 50 acres of which were in fruiting the past season, and yielded 3,400 bushels of cranberries, worth, at $4 per bushel, $13,600. Three-eighths of said tract was recently sold at $1,000 per acre. I might mention the names of those parties, if necessary, but the object in referring to them was merely to enforce the principles and facts illustrated by their successful operations, which many others are pursuing; and hundreds of acres are now annually redeemed from a primitive, unproductive condition and devoted to cranberry culture.

There are now in New-Jersey about 2,000 acres in fruiting, that produced last year 150,000 bushels of cranberries; and 4,000 acres more land have been prepared and planted, and will be in fruiting hereafter. New-Jersey now supplies more than two-thirds of the whole amount of cultivated cranberries marketed in the United States. The late reports by the Agricultural Bureau at Washington, for the year 1869, give as follows, viz:

To the State of Maine,			1,000	barrels.
do.	do.	Massachusetts,	8,000	do.
do.	do.	Connecticut,	2,000	do.
do.	do.	New-Jersey,	50,000	do.

This amount, of 61,000 barrels, was derived principally from cultivated fields.

All other States and Territories, including wild and cultivated cranberries, produce about 14,000 barrels, making a total of 75,000 barrels for the year 1869. The crop for 1867 was estimated 62,500 barrels of which New-Jersey produced 35,000, New-England about 12,000, and the West 15,500 barrels. The average price for 1867 was $16 per barrel, giving a total value of $1,000,000 for the crop that year. The crop of 1869 commenced to sell at picking time in Philadelphia for $9 per barrel, and gradually advanced in price until spring, when the market value was $24 to $26 per barrel. One grower in Burlington County, it is reported, sold a lot of 600 barrels for $15,000.

The price of cranberries during the past winter has been about $12 per barrel. For seven years, from 1862 to 1869, the price ranged from $14 to $15 per barrel, except in 1868, when the price was from $22 to $24 per barrel, owing to the light crop. The counties of Burlington and Ocean yield the greater part of the cranberries grown in our State, and in 1869 they produced 31,700 barrels, and all other counties in the State 18,300 barrels. The yield of cranberries last year was not so large per acre as in 1869, on account of excessive rains, with intervals of intensely hot sun during the time of blooming. But the quantity of land in fruiting was more, so that the yield of Burlington and Ocean counties amounted to 38,300

barrels, and the State probably produced about the same as in 1869, say 50,000 barrels, which, at the present value, gives $600,000.

In embarking in the cranberry business, one of the most important matters is the selection of suitable land. The most productive cranberry region in the State is a belt of land underlain with white sand, much of it pure silex, the upland covered with pine and scrub oak; the low land and borders of streams, with white cedar and an undergrowth of whortleberry bushes. The soil is light, a thin coating of vegetable mould covering the surface.

The climate, as well as the soil, of this part of New-Jersey, is well adapted to the cultivation of this vine in the highest perfection. The picking is usually done by men, women and children, at a cost of about 50 cents per bushel; many of the hands will gather three to four bushels each per day. In sections of country where strawberries, raspberries and blackberries are extensively grown, a good portion of the pickers come from the rural or cranberry districts, commencing with strawberries in June, and after finishing them, enter the raspberry fields in July, and in August the blackberries are gathered, after which they return home in time to commence in the cranberry fields in October, and frequently have steady work there until cold weather, thus having a long, continuous harvest; such of them as are industrious and frugal, may soon provide homes for themselves and become proprietors of berry fields, and in turn give employment to others who are pursuing the same course of honest industry, a sure passport to wealth and competence.

Keeping Celery.—If the following mode, which we have tried thoroughly, has superior merit to recommend it, our readers may make a memorandum for autumn. The plants were grown in the usual way, but not blanched. About the middle of November, a trench a foot and a half deep, or just deep enough to take in the plants when set upright, was dug in a hollow which had perfect underdrainage, and the plants then carefully lifted out of the soil in which they grew, the earth shaken from the roots, and they were placed upright in the trench as closely as they could be conveniently packed. The earth was then drawn against the sides along the trench, and the top covered with a stratum of dry leaves a foot thick. A few inches only of leaves were first applied, but as the cold weather of December came on, more leaves were added. Being in a hollow, the wind did not blow the leaves off, while the snow drifting on added to the protection. Towards spring the stems were perfectly blanched, and there was not the slightest difficulty in procuring a supply at any time by merely lifting off the leaves—vastly easier than to remove frozen earth. Finer celery is not often seen. Those who have no similar depression in the ground may dig a foot deeper than otherwise, lay a tile in the bottom for perfect drainage, put in the plants, and then there will be a foot left to fill with leaves. Lay on a few evergreen boughs to keep any of the leaves from blowing away.

PIGEONS—MANAGEMENT AND VARIETIES.*

THE DOMESTIC OR TAME PIGEONS are descended from the wild variety termed the Blue Rock Dove, an engraving of which is given above. So great a variety do they now present that, did they exist in a state of nature, they probably would not be regarded as belonging to the same genus or group by ornithologists. There are, perhaps, over two hundred varieties descended from the parent stock. The primitive bird is now regarded with slight esteem by fanciers ; the specimens are valued most as they depart from the original standard of their wild progenitors. Pigeons have been domesticated for many thousand years, the earliest record being traced to about 3,000 years B. C. About the year 1600 Akber Khan, by crossing the breeds, improved them very much, which seems never to have been practiced before. The Germans for a long period have manifested great interest in the rearing of pigeons, and through their persistent labors many rare varieties have been produced, which are known as "Toys." It is fortunate that male and female pigeons can be mated for life ; through this favorable circumstance many valuable and distinct varieties have been produced. In perpetuating the different kinds of pigeons, we depend upon the young's tendency to reproduce the peculiarities of their parents. Varieties occurring naturally are alone capable of being thus reproduced ; any artificial manipulation has no effect upon the offspring.

Of the extreme divergence in pigeons from the ancestral type, we have four kinds, viz.: the Tumbler, Pouter, Fantail and Carrier. Mr. Darwin, in "The Variation of Animals and Plants under Domestication," refers to the following difference in the points of organization in the domestic breed of pigeons. The shape and size of the skull differ considerably, and also

* Condensed from an extended series of articles by JAMES S. BAILEY, M. D., published in the COUNTRY GENTLEMAN.

the shape of the lower jaw and back. So may the shape of the nostrils, length and shape of the back and neck. The size and shape of the breast bone, the development of the ribs, and the number of the sacral vertebræ, differ, which some authors deny. These vary from 11 to 14. There is also a great difference in the number of tail-feathers, and in the number of the primary and secondary feathers of the wing. The length of the feet and beak usually correspond; when one is short, the other is short, and *vice versa*. The size and shape of the eggs differ; also the power and nature of flight. It will therefore be seen that the difference in plumage alone is not the only characteristic in forming new varieties.

When varieties are developed in the state of nature, they are not apt to be propagated, but by selecting, any singular feature may be preserved until a new variety becomes established and perpetuated.

In the "Origin of Species," Darwin remarks: "When two birds belonging to two distinct breeds are crossed, neither of which is blue or has any of the above specific marks, the mongrel offspring are very apt to acquire these characters. To give an instance out of several which I have observed: I crossed some white Fantails, which breed very true, with some black Barbs, and it so happens that blue varieties of Barbs are so rare that I never heard of an instance in England, and the mongrels were black, brown and mottled I also crossed a Barb with a Spot, which is a white bird with a red tail and red spot on the forehead, and which notoriously breeds very true. The mongrels were dusky and mottled. I then crossed one of the mongrel Barb-Fantail with a mongrel Barb-Spot, and they produced a bird of as beautiful a blue color, with the white croup, (rump,) double black wing-bars, and barred and white-edged tail feathers, as any wild Rock Pigeon."

The reader will observe from this the manner of creating new varieties. After a score or more of generations, there is not much disposition to revert or to breed back. The amateur pigeon fancier, in selecting birds to breed from, should allow none but pure bred birds to enter his dovecote. "*Like produces like*," and if the parents are inferior, their offspring will inherit their imperfections. Each established variety has its own peculiar markings, and the fancier should first acquaint himself with sufficient details to prevent imposition. For example, a white pigeon of any variety should not have foul feathers; the bill and toe-nails should be white; if black or striped, their offspring will ordinarily be unreliable, being often marred with foul feathers. The cost of rearing high bred pigeons does not exceed that of common sorts, and fancy pigeons not pure bred are not more prized than common varieties.

Accommodations Required for Pigeons.

When suitable birds are selected, accommodations for their reception should be procured. It is seldom the case that a room is purposely built for pigeons. If possible, especially in this cold climate, one should be selected with a southerly aspect, as it tends to encourage early breeding.

The loft should have plenty of light and ventilation. I would especially caution the fancier to make his loft proof against vermin, not only against the ingress of cats, but also rats and weasels. The writer, having had sad experience in this respect, can testify in reference to this annoyance. When vermin acquire a taste for pigeons, it is very difficult to prevent them from infesting the dovecote. Rats not only have great skill in climbing, but leap astonishing distances, and are not content in destroying eggs and young birds, but attack the parent birds also. Strips of tin should be employed to keep them from climbing and from cutting through into the pigeon room. Cleanliness is very essential. If the dovecote is neglected, and filth and manure allowed to accumulate and become offensive, vermin and disease must be engendered.

It is said that pigeons kept in confinement will not increase and remain healthy, even if an area is provided for their exercise. This is not strictly true ; the contrary has been demonstrated by the writer, and others in this city. It must be admitted, however, when pigeons are flown they are more hardy than when confined to the loft. The young are more certain of maturing if the parent birds are flown ; there is a certain kind of food they obtain, essential to their growth and healthfulness, that they do not get when confined and fed upon a variety of grain.

Pigeons are a thirsty bird, and must be supplied with an abundance of fresh water. This is especially the case when young birds are being fed, as the parents' crops cannot be discharged into the throats of their young without taking a copious draught of water beforehand. Pigeons are not dusting birds like fowls, but cleanse themselves by bathing. In our own loft pans made of zinc are provided for this purpose, 14 inches in diameter, and capable of holding 2 or 3 inches of water, which enables them to lie down and expand their wings and loosen the arrangement of their feathers. Milk pans made of tin or earthenware will answer the same purpose, but zinc possesses advantages over both, as it does not corrode like tin, or break as easily as earthenware. The bathing pan should be elevated from the floor upon a stool, so that in flying up to bathe, the particles of dust are shaken from their feet, and the water does not so soon become filthy. Pigeons' mode of drinking is characteristic ; the beak is plunged deeply into water, when long draughts are taken. This is repeated many times during the day—they consume much more water than is supposed. When they are kept in confinement, fresh water should be furnished them for bathing purposes at least once a day. Small fountains should be filled twice each day for drinking purposes, and should be sufficiently small to prevent the birds from making the water filthy by bathing in them.

A still better plan would be to procure a drinking fountain. It possesses advantages over other arrangements for supplying drinking water. It is so constructed that the bird cannot step into it and render the water filthy. The supply is constant, which is highly important when pigeons are rearing and feeding their young. The water in the dish is renewed many times a day, and is automatically fed into the dish as required, (fig. 94.)

Pigeons have a great fondness for salt, a natural instinct which should be indulged. This may be inherited from their ancestors, the Rock doves, which frequent the sea-shore and drink the water partially evaporated by the sun, which is left in the pools by the receding tide. Some fanciers nail a piece of cod-fish near some convenient perch, so that they can supply themselves whenever desired; others keep lumps of rock salt in vessels for the same purpose. It is very convenient to mix Indian meal with table salt in the proportion of one-quarter of the latter, and place it within their reach; there is not so much danger of their injuring themselves by over-eating if prepared in this way.

Fig. 94.

Calcareous matter is also necessary to form material to furnish the egg-shell. This is readily supplied in the form of dry mortar or calcined oyster-shells. Some argue that the food should contain the necessary material for this purpose; it is true, in a great measure it does; but if an abundance of calcareous material is supplied, eggs without shells will not be found in the loft.

Construction of Dovecotes.

Since the fancier has become acquainted with the origin of the pigeon, the detail of selecting, its habits and peculiarities, it will now be necessary to look into the dovecote and become familiar with its construction, furniture, &c.

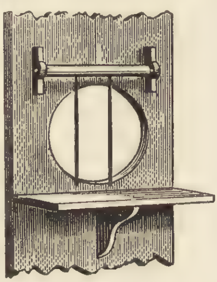


Fig. 95.

The loft should be well sheltered, and made comfortable, as it is desirable to rear the greatest number of young birds possible. The more hardy varieties, if given a proper chance, will ordinarily breed nine months in the year. When birds are flown, free ingress and egress to the loft should be allowed through openings of a circular form, at least 5½ inches in diameter, with landings securely fastened inside and outside, at least 4 inches in width. It is necessary sometimes to confine the birds in the loft, and for this purpose slides are constructed so as to be worked by pulleys to close these openings.

It not unfrequently happens when these slides are down, that some straggling birds may be shut out. For the purpose of allowing them ingress, bolting wires are constructed—see fig. 95. This illustration shows the construction as seen from the inside of the loft. Above the aperture is

fixed a small roller, turning upon a wire, which passes through the brackets upon both sides. Through this roller are wires inserted, which extend over the opening. They should be placed a little less than 2 inches apart, so as to allow a pigeon space to thrust his head and neck through. At the bottom these wires are unattached, so that when the bird pushes from the outside it raises them and gains an easy entrance, but not so when pushing from the inside.

The most important feature of the loft, when many birds are kept together, is the arrangement of shelves or breeding places for each pair. Our loft, which is a small room partitioned from the hay-loft of a barn, is about 5 feet wide by 14 long. On one side and end are placed shelves 20 inches in width, at intervals of 18 inches between them. The divisions between them are made of upright partitions placed not less than 3 feet apart, so as to form breeding places for the different pairs of birds—(see fig. 96.) This arrangement is ample for any variety, not excepting the Pouter. Other varieties do not require so much room.

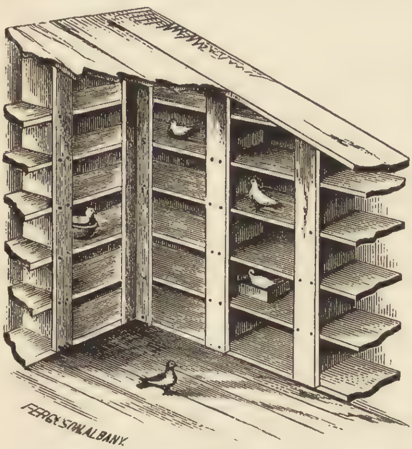


Fig. 96.

After the shelving is constructed in this manner, a wide board should extend centrally over and in front of each partition from the floor to the ceiling. This arrangement gives eaeh nesting pair the privilege of concealment in either end of their pen, which is very necessary for their success in hatching.

It is important to have nests placed at both ends of each pen. A pair of birds will often go to nest before the last hatched young are able to fly or feed themselves; therefore it is best to have both ends of the pen supplied with nest boxes, so that the birds can rear a pair of young and hatch at the same time.

Trumpeters, Fantails and Runts do best upon the lower tiers, or upon the floor.

Pigeons, when left to themselves, construct a very clumsy nest. It is always advisable for the fancier to fashion them for the birds. The best material for nests is a little soft hay or fine straw, which should be shifted at least twice during the rearing of each nest of the young.

There is a diversity of opinion in reference to the construction of the

nests. Some prefer earthenware nest-pans, (fig. 97;) others prefer square boxes like fig. 98. There are objections to the earthen dishes; while they are easily kept clean, the material used for nesting is not so readily retained in its place, which renders the eggs more liable to be broken. If

Fig. 97.

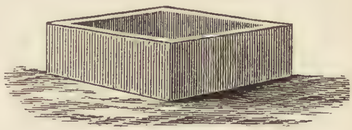


Fig. 98.

earthen pans are employed, holes should be cut into the shelves to receive them. An objection may be urged against boxes on account of harboring vermin. This is really a slight objection, for if cleanliness is maintained and the straw shifted often, there is no necessity for vermin being engendered. I decidedly prefer the nesting boxes, which should be made 10 or 12 inches square, and 4 or 5 inches high; they are not so easily broken, and can be manufactured by any carpenter.

The matching of birds properly is an important point in breeding. The knowledge requisite for this is only acquired by long experience, and even then depends much upon the judgment of the fancier. By the middle or latter part of February, if the season is favorable, is the best time for pairing birds. The first two litters seldom produce anything, as soft or thin-shelled eggs are apt to be laid, or single eggs, which are not worth while, except by way of steadying the birds in good breeding order by the time the weather becomes favorable for raising hardy young. In matching birds, care should be taken to counteract bad properties or imperfections. Birds having deficiencies should be mated with such as are particularly perfect in those points where their mates are defective. It would be better to mate equally perfect birds, but many times this is impossible; so the best selection must be made. It must not be forgotten that much more depends on the hen in transmitting qualities than on the cock. The color is generally inherited from the cock. A superior hen mated with an inferior cock will produce better birds than if mated reversely.

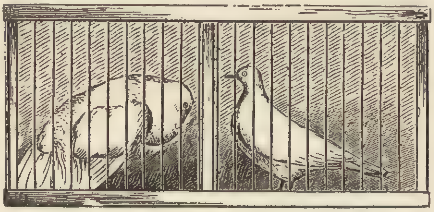


Fig. 99.

For pairing or mating birds it is necessary to have a cage like fig. 99 with a partition through its centre, which will prevent the cock from abusing the hen for the first few days. They should be placed out of sight of the

other birds, when the cock will soon make advances toward the hen. The partition may then be withdrawn, and the birds be allowed to go together. When the cock is observed calling the hen to nest, they may be considered as paired, and they then can safely be returned to the loft. The length of time necessary for pairing depends much upon circumstances—pigeons at times are more anxious to mate than at other times, and when this is the case they will mate sooner. The birds being paired, it is next necessary to make them thoroughly acquainted with the pen designated for their habitation. Each pair should be confined to their pen for a few days by means of lath or wire cloth fastened over the front. The pens should then be opened on alternate days, until they learn the places designated for them.

Management while Breeding.

Care should be taken not to allow a cock to become master of two pens, for he will never rest until he has driven the other pair from their home and demolished their eggs or killed their young. If this becomes the case, the safest remedy is to transfer him to another loft, for it is difficult to break him from it. In remating the birds, which is sometimes desirable, care should be taken to give the cock the same habitation ; if not, he will master two pens. Hens, when thoroughly mated, will follow their cocks ; the same care with them is not necessary.

When hens are near laying, the cock manifests great anxiety, and will continually drive his mate from place to place till she goes on her nest. If the cock is too violent in his attention, it is best to keep him penned until after the hen has laid her eggs. Hens at this time are observed to sit with their feathers set up as if unwell, and a protuberance is often seen on the rump, with the tail drooping. A hen usually lays two eggs, skipping one day between the first and second. If she only lays one egg, except in early spring, it is an evidence of debility. After the first egg is laid, which is usually about 6 P. M., the pair alternately stand over it until the second is laid, which is usually on the third day, between 1 and 2 o'clock. Incubation then commences as follows : The cock being in waiting sends the hen off as soon as the second egg is laid ; she returns between 4 and 5 o'clock in the afternoon, and sits until about 10 A. M. the next day, when the male returns to the nest and sits until the female returns, at 4 P. M. During the seventeenth day after the last egg is laid, the egg will be chipped and hatched.

Pigeons, when hatched, are very helpless, and at first are fed entirely with a curdy substance, which is secreted, by the end of the sitting period, in the crops of the parent birds. Fanciers term this "soft food," or "pigeon milk." This curdy substance is entirely the product of incubation, and is developed alike in the crop of both parents, although the cock sits only about one-fifth of the period. If the young do not emerge from the eggs by the eighteenth day, the old birds will desert their nest. The secretion of "soft food" cannot be delayed. It sometimes happens that about the

time of hatching, the eggs or young are destroyed by accident; nature being thwarted, and the parent pigeons not being able to feed off their soft food, sickness is invariably produced, which is evident from the birds' sitting with feathers rumpled, looking dumpish, for a few weeks, when either recovery will take place, or some malady of a graver nature will produce death. The young, in receiving their nourishment, thrust their beaks into the side of the old bird's mouth, (see fig. 100,) when the soft food, by a sort of convulsive movement, is discharged from the crop of the parent and received into the widely expanded mandibles of the young. As the young bird increases in size and strength, the soft food lessens in quantity. The grain which constitutes the food of the old bird becomes mixed with the curdy secretion, and at the expiration of the seventh or tenth day the young are fed entirely with disgorged grain, until they are able to fly and seek their own nourishment. John Hunter, the eminent physiologist, was the first to notice and describe this curdy secretion, in a paper which he published in the "Philosophical Transactions."

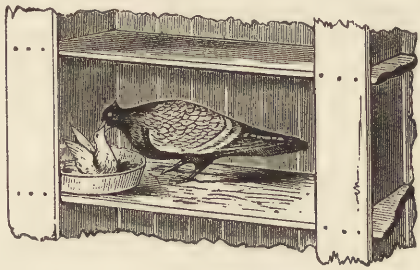


Fig. 100.

The young are fed until nearly full grown and their plumage is nearly perfect, when the parents consider it quite time for them to begin to shift for themselves. We then notice the old pigeons' ingenuity in leading them from their nest by suffering them to fast for an unusual period, when they eject but a small quantity of food in their crops and gradually walk off from them, and the young, already nearly capable of flying, make an effort to pursue them. When the young are beginning to fly, a separate apartment should be provided for them, for the old males have a propensity to tread them, and by their weight and strength will so mangle their backs as to destroy their lives.

Description of Varieties.

The Fantail.—It is supposed that Fantails were originally produced by selecting birds with extra tail feathers, and again selecting such of their offspring as presented the desired characteristics. They are most commonly all white, though we sometimes see a variety of colors, black, blue, copper and yellow. White birds are generally the most perfect and graceful in their carriage. Fig. 101 gives an idea of this most beautiful bird, and at once suggests its important characteristics.

It is generally believed that the Fantail originated in Hindostan. Many superior birds have been brought from India, where they have long been

cherished as great favorites. These birds differ somewhat from the English variety, by possessing a slight tuft on the back of the head, and do not have the same majestic carriage. Tufted birds are usually coarse about their necks, and consequently are not awarded prizes.

The important characteristics of the Fantail consist in the extraordinary development of the tail feathers, and the mode in which the tail is carried. It has been mentioned that the ordinary number of tail feathers in pigeons is 12; in this variety we not unfrequently have 40, and in some cases as many as 42. The best show birds usually have about 28. The tail should be carried well over the back and a little forward. The graceful, swan-like neck should rest against the tail, or nearly so. The wings should rest against the body, and the tail should overlap the wings. This extraordinary development of the tail feathers obliterates the oil-gland which is supposed that birds use for oiling their feathers. The Fantail should be small. The colors are various; many shades may be produced by crossing and selecting. The eyes should be black.

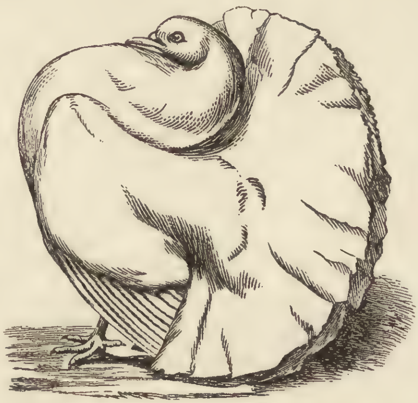


Fig. 101.

The English Carrier.—Several distinct varieties are confounded under this name, which was originally used to designate pigeons employed for the purpose of carrying messages from distant points home. The pigeon now known as the English Carrier is a very artificial, high-class bird, but is not employed for this purpose. There is no record of the origin of the Carrier. Domestic pigeons vary in the amount of naked membrane around their eyes and nostrils, and also in the length of their beaks, and in the development of their limbs. By carefully selecting in breeding, these peculiar properties are developed more markedly. This remarkable bird has undoubtedly been produced in this way. Barbs have the membrane around their eyes remarkably developed. The Scanderoons, the German Bagdotten, the Bagadais of the French, have extremely long beaks, but still there is no breed that compares in these extreme properties with the English Carrier, which is represented by fig. 102. The Carrier is larger than the majority of common pigeons. A bird well developed should weigh 18 ounces, and measure in length, from

the point of the beak to the extremity of the tail, 16 inches. The shape is usually symmetrical, the neck long and slender, and the bird should stand erect. The Carrier is reckoned to have twelve points—three in the beak, three in the wattles, three in the head, and three in the eye. The beak should be long, straight and thick; it should measure in length at least $1\frac{1}{4}$ inches. The wattles ought to be broad across the beak, short from the head toward the point of the bill, and tilting forward from the head. The head should be long and narrow; the skull flat; the eye broad and round, and of equal thickness. Such birds are termed rose-eyed, and are highly valued. The neck should be long and thin, and the chest broad. There are several colors—black, dun, red, mottled and pure white. The feathers are dense, and a perfect bird should appear as if cut from stone. They should be fed from boxes; owing to the size of their wattles they cannot see to pick up a single grain if thrown upon the floor or ground.

Fig. 102.

THE HOMING BIRD.—Under this class are several varieties of pigeons which are remarkable for their powers of flight, and for their attachment for the place in which they have been reared. These birds are totally distinct from the Carrier, although they are really used for the purpose of conveying messages long distances. The varieties in which this homing faculty is developed in the highest degree are of Belgian origin, and are known as Antwerps in England, and in Belgium as Smerles, Cumulets and Demi-Becs. Of these varieties the Smerles stand foremost. They are rather small birds, and some suppose that originally they were bred between a Blue Owl pigeon and a Blue Rock. The shape of their skull indicates a full complement of brain and intelligence, and contrasts strongly with the English Carrier. Their striking characteristics consist in the firmness and great breadth of the flight feathers of the wing. These overlap each other and afford a strong and firm wing with which to urge their flight. The muscles that contribute to their powers of flight are extremely developed. They are not reliable in breeding true in color. The Belgian amateurs do not place the slightest value upon this property. They match birds without regard to color—speed is the only property they wish to attain. The

Belgians are not partial to white birds, as they are more conspicuous in flight than those of a dark color, and consequently are more liable to be destroyed by hawks.

The editor of *Le Pigeon* states that " when two years old they are capable of returning from Bordeaux to Liege or Verviers (a distance of over 500 miles) in 12 hours, provided the sky be clear and the wind favorable. The journeys from Tours (330 miles), Chatellerat (365 miles), and Poitiers (380 miles), are performed by the same birds in eight hours." The training that these birds receive is severe. The young birds should not be flown more than 75 miles at a time the first year, and even then their first flight should be a much shorter distance, each time to be increased, until this distance is attained, so that they may become familiar with the landmarks by the wayside. The longer and severer tests are made by mature and practiced birds. These birds do not fly from instinct, but by sight. The best birds will not fly in a fog, nor will they fly by night, and when overtaken by darkness will alight until morning and then renew their journey. When turned loose, the bird flies round and round in gradually increasing circles until some familiar object is descried, and then starts on its homeward flight. If the bird is again flown over the same route, he starts instantly. The extent of vision is increased much by elevation. The message is usually written on tissue paper and neatly fastened around the leg by a silk thread. In this manner it does not interfere with the bird's flight.

Fig. 103.

Fig. 104.

Fig. 103 gives a correct idea of the Antwerp Homing pigeon. It does not resemble the English Carrier, as will be observed by refering to fig. 104, which illustrates the appearance of the head of a well bred English Carrier.

Both the Carrier and Antwerp are strongly developed birds and rapid fliers. Their heads contrast strongly; the narrow and flat head of the Carrier is very unlike the broad head of the Antwerp, with its corresponding amount of brain and intelligence.

The usefulness of the carrying bird depends much upon its attachment for home and the place in which it has been reared. This faculty in the Antwerp seems to be developed in a remarkable degree.

The Franco-Prussian war developed inventive ingenuity which was employed to enable Prussian-guarded Paris to communicate with the outer world. Pigeon posts were established; Homing birds were transported by means of balloons, and after receiving the miniature despatch, were released to plow their way through ether blue to their cherished dovecotes and homes. Necessity may well be said to be the mother of invention. The late war in America did much to develop the inventive genius in the manufacture of death missiles; so has the Franco-Prussian war aided in encouraging the training of the message-bearing birds to convey tidings to loved ones at home. The camera and microscope have been brought into requisition to aid in telegraphing by means of the Carrier. The French government has informed us that no less than 3,500 despatches of twenty words each—in all, 70,000 words—can now be carried by one of these aerial messengers. Under the powerful lens of the microscope, these messages, which are invisible with the naked eye, are made plain and legible. It is even possible to condense, by means of stenographic characters, a page of the COUNTRY GENTLEMAN into the incredible space of one-fourth of a square inch! On the line of the pigeon posts established between Tours and Paris, the birds being transmitted by balloons, a person could send a despatch containing twenty words on payment of fifty centimes per word. The despatches were not however insured against the legions of hawks that were trained by the Prussians to capture the Carrier. Fig. 105 gives an appreciative idea of some of the perils incident to these ornithological postmen. The superior swiftness of the Car-

Fig. 105

rier generally eluded the hawk's vigilance, for we are informed that they seldom fell a prey to the relentless foe.

Several methods have been practiced in fastening the message to the pigeon. Birds have been pictured, to please the imagination, with letters suspended around their slender necks, but really this method is impracticable. A better way has been devised than wrapping the message around the bird's leg, securing it with a silk thread. Fig. 106 represents the middle tail feather, which remains stationary during flight, partially stripped of its plumage, with the letter securely rolled upon it and fastened. The manner of marking the feathers of the bird, designating its number and place of departure, is represented in fig. 107.

Fig. 106.

Fig. 107.

Though the speed of the Carrier pigeon is very great, it undoubtedly has been overestimated. It is calculated that in traveling a few hundred miles the speed of the Carrier is not equal to a steam locomotive. Fig. 108 represents the Antwerp pigeon in flight, with a message attached. Annual races have been practiced frequently between 70 or 80 birds from Antwerp to Paris, as a trial of speed, which have given the average and also extraordinary speed of these birds.

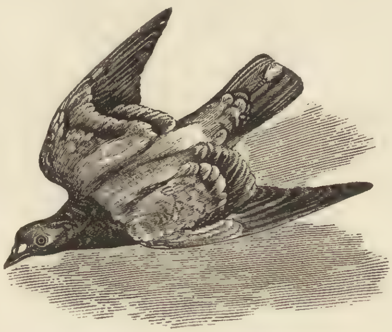


Fig. 108.

THE TUMBLER was so called on account of tumbling over backward during flight. This quality seems to be hereditary. Many birds now designated by that name are worthless, not having this peculiar property transmitted, through carelessness in breeding and mixing with the common pigeon. Nearly every variety has peculiarities in flight. The Homing bird darts off rapidly; the Pouter forcibly smites his wings; the Roller ascends to a great height in the air, and then turns from side so side with great rapidity in descending. Tumbling seems to afford them pleasure; they never do it unless in good health. They sometimes rise to an astonishing height in the air, so high that they can with difficulty be seen. If a flock are well trained, they will

keep close together; they do not separate like other pigeons. They usually tumble most when ascending and descending, while within a few hundred feet of the ground.

Tumblers should be kept by themselves. If allowed to fly with other pigeons, they will not exhibit their powers of flight or their striking peculiarities. They ought not to be allowed to fly more than three times per week, if you wish to see them do their best. The morning is the best time of day. After they have exercised sufficiently, they should be fed. They will soon expect food at this time, and will come immediately to the loft to receive it. In rearing Tumblers, if possible, birds that are trained to fly high should be used for the purpose of enticing the young to follow them up.

SHORT-FACED TUMBLERS.—These varieties are produced by carefully selecting brood-stock until the properties desired are propagated perfectly.

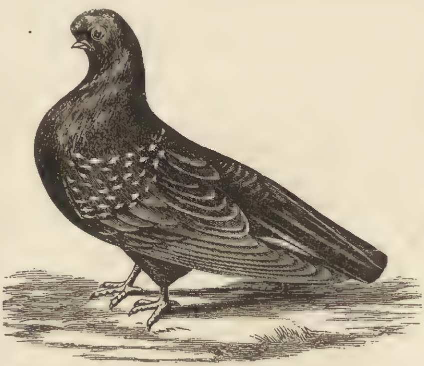


Fig. 109.

Fanciers have endeavored to bring the tumbler to a high state of perfection, for a century at least. Their aim has been to produce birds with a very small beak, full protruding forehead, and a small sized body and a peculiar carriage—see fig. 109. A modern writer has compared its head to a cherry with an "oat placed in it for a beak."

The SHORT-FACED BALDHEAD TUMBLER deserves description; an illustration of its head is given, fig. 110. They are bred of all colors, blue, black, red and yellow, &c. The white feathers confined to the head are distinctly separated from the colored feathers of the neck—as amateurs express it, "are clean cut." It should have ten white flight-feathers in each wing, with a white tail and thighs, and a white or pearl eye.

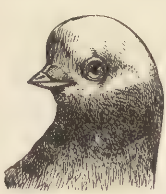


Fig. 110.

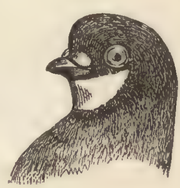


Fig. 111.

THE BEARD OR BEARDED TUMBLER, (fig. 111,) is a very handsome bird. They vary in color, as do the other varieties described. They should have white flights, though we seldom find more than six or seven of the flight feathers white. Their eyes, thighs

and tails are the same as Baldheads. They derive their name from the streak of white or crescent under the beak. In Blue Beards, as in Blue Baldheads, the black bars on the wings and end of tail should be dark and well defined.

THE HOUSE TUMBLER, owing to some abnormal development of the brain, carries the tumbling propensity to an extreme degree. They are comparatively incapable of flight, and whenever they make an effort to fly roll over and over. They are termed House Tumblers because their exhibitions are confined generally to the house. The writer has seen one of this variety which, when tossed a few feet from a handkerchief held by the corners, turned over *fourteen times* before touching the carpet.


Fig. 112.

THE OWL in form resembles the Turbit, except that the upper part of its beak is hooked like the owl, which circumstance probably gave it its name. In size it should be a little larger than the Tumbler. The feathers on the breast open and expanded both ways, forming a frill. The larger this is, the better. It has a gravel eye. Fig. 112 represents the head and frill. It is a very compact bird and rapid flier. Well bred birds should weigh about seven ounces each, and measure in length eleven inches. Its chief peculiarities are in the head, which should be small and round, with a short hooked beak. The eye should be large, full and expressive, with the iris dark.

THE TURBIT is also a very compact bird, with a short thick bill, which resembles the Bullfinch. In addition to the frill or purle, it also has a turn crown—see fig. 113. The tail and the back of the wings should be colored alike, and the rest of the body and flight feathers white. Some Turbits are all of one color—white, black or blue. It is a very prepossessing bird, and symmetrical in shape.


Fig. 113.

THE ENGLISH POUTER ranks first among high-class birds. It is an admirable show bird, and should possess five points of excellence to excel

and command success in a show-pen, viz.: 1st, length of limb; 2d, length of feather; 3d, slenderness of body; 4th, size and carriage of crop; 5th, color. The points now held in esteem are the same as those that were recorded 140 years ago by Moore. The length of limb is measured from the joint nearest the body, to the end of the nail of the centre toe. Mr. Tegetmeier remarks that the best bird he ever bred only measured $7\frac{1}{4}$ inches in length of limb. The leg should also be closely feathered to the tip of the toes. The length of feather is measured from the tip of the beak to the extremity of the centre feathers of the tail; 18 inches is recorded as a remarkable length. Slimness in girth is an essential point which adds much to its elegance; an exaggerated statement is that its body should be enabled to slip through a wedding ring. The size and carriage of the crop is another important point upon which its elegance greatly depends. When distended it should be as globular as possible. In color we find it various; the most common is the blue-pied. The white Pouter is an exceedingly neat bird, and of very pleasing appearance. With me it is a favorite, and is also preferred by many breeders. White Pouters should have a white beak, white toe-nails, a dark eye, and plumage of immaculate purity, together with other points heretofore mentioned. As the elegance of the bird depends much upon its erect carriage, much care should be taken to prevent its contracting a habit of stooping by having its place of entrance and apartments too low and contracted. The crop should be large and round, "especially towards the beak, filling behind the neck so as to cover the shoulders and tie neatly off at the shoulders and form a perfect globe"—see fig. 114.

Fig. 114.

The Pouter is a bird of large size. It is remarkable for its peculiar faculty of inflating its crop to a prodigious size, so that it appears larger than all the rest of the body. It has the power of retaining the air in its crop when inflated, and does it when it springs forward. The flight of the

Pouter is stately and dignified. The necessary muscular exertion to propel it does not diminish the size of its crop, but it glides leisurely forward, unless caught in a strong breeze, when it may be carried like a soap-bubble, to a distance too considerable to be enabled to find its way home.

They sustain bad reputations as nurses and rearers of their young, although they seemingly have strong affection for them. It is therefore often necessary to exchange their young with another variety in order to increase their stock. The female, while she seems attentive to her liege lord, is frequently guilty of carrying on sly flirtations with other males in the same dovecote, and although her mate performs his proportion of the duties in feeding their brood, the fancier is often surprised to find the increase inheriting the color and proportions of some other variety. For this reason it is very prudent to keep Pouters by themselves, or your stock will deteriorate.

Some of the crosses between Pouters and other pigeons are valuable, chiefly for the reason that they make the best breeders and feeders. It will be convenient to have a few pairs for the purpose of rearing the more delicate varieties. Close inter-breeding in Pouters should be avoided. Closely related birds should never be mated, as the stock will deteriorate in length of limb and desirable characteristics. The hen exerts a stronger influence in transmitting form than the cock. The color is more readily transmitted from the cock.

Fig. 115.

THE ISABEL, fig. 115.—Among the best known varieties of small Pouters are the Isabels, which probably derive their name from their color. They have good sized crops, and feet heavily feathered. Their color varies from a light fawn to a pale yellow. The characteristic black bars upon the wings of the Blue Rock in this breed are supplanted by two white bars. Isabels are delicate and elegant birds. They breed freely, and are perfectly hardy.

THE PARISIAN POUTER was originally bred in Paris, and afterward introduced into Brussels, and thence into England. In size it is not so large as the English Pouter, but partakes of its nature, and is long-cropped.

Its girth is thick, legs short, and short bodied. Fig. 116 represents it. The feather is very beautiful, being chequered with various colors in every feather except the flight, which is white. It is esteemed most in proportion to the quantity of red it has mixed with the other colors. They are generally bull or gravel eyed. There are many breeds of pigeons which have the power of inflating their crops to some extent. The wild Rock Dove possesses this faculty.

Fig. 116.

THE JACOBIN, or Ruff, as it has been vulgarly called, is a beautiful bird when well bred, and is now quite frequently seen in the pigeon loft. There are few varieties so well recorded by ancient writers. Moore was of the opinion that it derived its name from its feathers being inverted quite over the hinder part of its head and shoulders, resembling a friar's hood, because the fathers of the Jacobin order wear hoods to cover their bald crowns. These feathers are called the hood, and the closer and thicker they lie to the head, so much more are they valued. We call the lowest parts of the feathers upon the neck the chain; the Dutch term it the cravat. By taking hold of the end of its bill and pulling it forward, the chain should lap in a perfect bird. Fig. 117 represents the head and shoulders of a well bred Jacobin.

Fig. 117.

Fig. 118.

THE BARB.—Shakespeare, in the year 1600, referred to the Barbary

pigeon; Willoughby described the Barb in his Ornithology in 1678. An admirable likeness of the head of this bird is given in fig. 118. The Barb should be small; specimens are valued most as they vary in size; that is, a cock should not weigh more than 12 ounces, and if less, so much the better. The body is bulky. The flight feathers should be rather longer than in most other varieties. They should be self-colored, and are most prized as I name their colors—1st, black; 2d, yellow; 3d, white; 4th, red, and 5th, dun. Fig. 119 gives an illustration of the form and carriage of a black Barb.

Fig. 119

Fig. 120.

BLUE BRUNSWICK (fig. 120.)—Under this title we often see a pigeon with the following characteristics: The flight feathers, wing bars and head are white, the rest of the plumage being light blue.

BLACK PRIESTS (fig. 121) also have broad turn crowns, white heads, white wing bars, and sometimes a white bar across the tail. I take the following desciiption from a celebrated German writer, Neumister: "1st. The Black Priest pigeon, both with and without the white wing bars, and occasionally with

the spangled shoulders of the Suabian pigeon cross. 2d. The Blue Priest pigeon, with either black or white wing bars; also occasionally spangled like the foregoing. 3d. The Brown-Red Priest pigeon; these rarely have the white wing bars, but when they do, the flight and tail are usually strawberry colored. The chief point is to have them of an uniform dark brown red. 4th. The Yellow Priest pigeon has markings similar to the red, and is equally rare, with white wing bars. 5th. The Wild Blue Priest pigeon; their color is a light or mealy blue, with the white head, like all the others, but without any other markings whatever, not even the black wing bars so common to blue pigeons. These are, however, not very plentiful."

Fig. 121.

VERMIN INFESTING PIGEONS.

Pigeons confined to the loft are often infested with parasites or lice. Four distinct species are found upon them:

The FEATHER LOUSE, (*Lipeurus baculus*,) is the most common and interesting. It is found on living birds between the vanes of the feathers. It is of a dull yellow color, its head and chest being of a bright chestnut color. Fig. 122 represents this species magnified. It does not seem to injure the bird, but its nourishment must be drawn from the bird, and when found in great numbers they must have a tendency to debilitate the subject.

Fig. 122.

The feather-louse, after the death of the bird, collects upon the feathers of the head and neck.

The form of the feelers of the male and female differ—see fig. 123. The male may be distinguished by its having hooked claws.

Fig. 123.

During the summer time, in over-crowded filthy lofts, a small mite, a species of *Ascarus*, annoys the birds. It inhabits the cracks in the walls and nests, or

any place where it can conceal itself; at night when the pigeons are at rest it commits its depredations upon them. If not attended to, they undermine the health of birds by depleting them.

The third variety, a species of *Ixodes* which, when grown, is as large as a tare, is sometimes found upon birds. Also a kind of flea, the *Pulex columbea*, is sometimes found in dry, dirty lofts. All these varieties derive their substance from the bird, and harass them exceedingly, which will cause them to grow thin in flesh, even when well fed.

TREATMENT.—Clean the loft by scraping up the birds' droppings; whitewash the pens and walls, and sprinkle lime upon the floor. Cleanliness is the greatest preventive of these pests. Kerosene sprinkled throughout the loft, or spirits of turpentine, has a tendency to scatter them. Dusting flour of sulphur thoroughly under the feathers, or using a little lard, making it quite thin by kerosene, and applying it moderately to the crown of the head and neck, the buts of the wings and rump—will give these parasites a distaste for the bird as a habitation.

DISEASES OF PIGEONS.

Pigeons, like domestic fowls, are reared so artificially that diseases have been engendered which were entirely unknown in their primitive state. These diseases are caused by neglect, and by the unnatural condition in which they have been reared. If birds are kept in clean habitations, well sheltered, and are well supplied with sound and wholesome food, and permitted to fly at large, where they can bathe at will, and have a constant supply of pure, clean water, disease will not often be seen among them. If their food becomes wet and mouldy, and they are fed in filthy lofts from the floor, which is covered with excrement, their digestion becomes deranged, and they fall an easy prey to the different manifestations of disease. As in the human subject, diseases in pigeons are generated. The transgression of the laws of hygiene develops maladies in man, while the pigeon becomes an unwilling prey from the carelessness and laziness of its keepers.

There is a variety of sickness described by most writers as infesting the dovecote, and with great wisdom they pretend to prescribe sure and effective remedies for its relief, while the tortured bird is subjected to the administration of nauseous drugs, and its remaining days rendered miserable through their administration, instead of being palliated or relieved thereby. "An ounce of prevention is worth more than a pound of cure." When the pigeon is discovered to be in the incipient stage of disease it should be removed from the healthy birds, or, ten chances to one, all will become contaminated and perish. In roup, the secretions from the mouth and nose of the infected bird will contaminate the water in drinking, and birds using the water from the same fount will soon pay the penalty.

The best suggestion I can offer as a medical man, and from experience, is to put the diseased bird out of its misery by decapitation, and then, if possible, ascertain the cause of sickness, and in future endeavor to prevent it.

Some of my readers may call me skeptical, and insist on my naming the various diseases, with a description of symptoms, and suggesting appropriate treatment for the same. For their especial benefit I will do so and endeavor to assist them in saving their favorite stock by suggesting treatment most likely to be successful.

Roup is a disease affecting the mucous membranes lining the mouth and air passages, and sometimes extending to the tear ducts into the eye, and often affecting the whole alimentary canal. It resembles a severe cold, and really is a species of catarrh. In progressed cases the discharge becomes purulent, and may be communicated to the remaining flock, as before intimated. This disease often originates in damp lofts in birds ill fed, which are more susceptible to the vicissitudes and changes in the atmosphere, and consequently take cold.

If treatment is availing, it must be in the early stage. A warm and dry atmosphere will not unfrequently restore the patient. If not, balsam will in many cases have a specific effect upon the inflamed mucous membranes, and can readily be administered by forcing a gelatinous capsule down the throat. The affected parts should be cleansed and penciled with a saturated solution of carbolic acid, or a solution of nitrate of silver in the proportion of ten grains to the ounce of water, which will often relieve. The sick bird should be kept warm and comfortable, and well nourished with stimulating food, such as hemp seed.

Rheum.—Manifested by frequent sneezing and shaking of the head. A slight purge with mucilaginous drinks is often sufficient.

Asthma.—Symptoms: Shortness of breath, particularly when agitated by exercise, opening the beak as if to gasp for breath. Treatment—change the food; change the habitation to a well ventilated and airy apartment; feed moist, and give a mild aperient.

Atrophy or Wasting.—Put a rusty nail in the water, which will strengthen and give tone to the digestion. Feed hearty and stimulating food with vegetable and green food.

Costiveness.—Give a spider to relax the bird's bowels; anoint its vent with castor or linseed oil; feed soaked bread and give generally moist food.

Diarrhœa.—Caused by giving the bird food which it is not accustomed to eat. Treatment—give boiled bread and milk; iron water with green food.

Epilepsy.—Feed the bird upon less stimulating diet, as soaked bread, mashed potatoes boiled, or plunge it into cold water now and then; bleed it by opening one of the superficial veins.

Sore Eyes are sometimes common in Carriers and Barbs, owing to the redundant growth of wattles around their eyes. Treatment—pencil the affected parts with a solution of nitrate of silver, or fused crystals of nitrate of silver, as recommended for roup.

SUGGESTIONS IN RURAL ECONOMY.

Deep Plowing—Measuring the Depth.

A WRITER gives a statement of the mode by which he secured a fine lawn about his dwelling, holding its freshness through the severest seasons of drouth, and being much admired for its "evergreen greenness." He remarks that in preparing the ground he went 16 inches deep, by means of a double Michigan plow, followed by a subsoiler, and as a proof of the depth of his plowing, a stick could be pushed down 16 inches in any part of the mellowed bed. The 16 inches, of course, referred to the depth of the mellowed soil, and not to the distance of the bottom of the furrow below the hard or unplowed surface. It makes a great difference which mode of measuring is adopted. The true mode for such measurements is from the surface of the unplowed ground to the bottom of the furrow ; but it appears from the preceding statement that some persons adopt a different mode. When, therefore, we see occasional accounts of subsoiling to a depth of two feet or more, we are not to regard them as exaggerations or loose and careless statements, but as measurements made from the top of the new ridges. But this is not the true way, and if adopted by the ditcher, who contracts to cut a drain at a certain depth, and measures from the top of the bank he has thrown out, he may easily get his full depth long before he is fairly entitled to it.

In making experiments with the double Michigan plow of the largest size, we have found three good yoke of oxen, or their equivalent in horses, necessary in running one measured foot in depth from the grass surface in an old pasture. But on measuring the bed of mellow earth which the plow had thrown out, without any additional subsoiling, the top of this bed was found to be fully 8 inches higher than the unplowed surface, or 20 inches in all, through which a sharp stick could be readily thrust to this depth. Fig. 124 is a cross-section of such a furrow, the hard sod on the left, the mellow bed of plowed earth on the right, and the sod which is pared off by the former or skim plow, buried deep at the bottom. Taking the average of good land, a single pair of medium horses will not plow more than about 6 inches deep without working too severely ; and if the sod is hard and dry, this will be too much for them to turn comfortably. Yet by measuring the inverted sod,

Fig. 124.—*Section of Sod-Land Plowed a Foot Deep with a Double Michigan Plow.*

the depth might be made 9 or 10 inches, according to the mode we have alluded to. A three-horse team will plow 7 inches deep, and in light soil 8 inches and sometimes 9, measuring from the compact side of the furrow. There is a simple and common-sense way of giving all such statements, not always adopted.

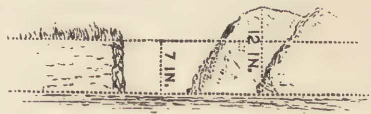


Fig. 125.—*Section of Sod-Land Plowed Seven inches Deep with a Three-Horse Plow.*

In plowing and subsoiling in connection with each other, if the common plow, drawn by the forward team, runs a furrow 7 inches deep, as in fig. 125, and the point of the subsoil plow runs down 7 inches more, fig. 126, (making 14 inches below the undisturbed surface,) the loosening of the earth by the subsoiler will fill the first furrow nearly half full, leaving only 4 inches of furrow vacant. From the top of this loosened earth to the bottom will be 10 inches. When the common plow throws its 7 inches of sod on this mellow bed, it will pile up 10 inches more, or 7 inches above the first hard surface. The whole mellow bed will therefore be 21 inches deep, or 7 inches above and 14 inches below the original grass sod.

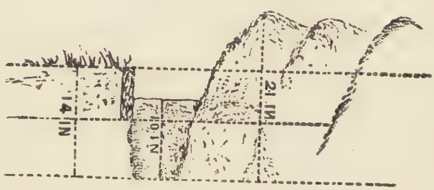


Fig. 126.—*Sod-Land Plowed Fourteen inches Deep with a Subsoiler.*

The difference between the bulk of the plowed and the unplowed earth will vary much with the character of the plow, and the condition of compactness of the earth before plowing. If the sod is an old pasture, that has been much trodden by cattle, and the plow used is of such a character as to pulverize the inverted sod in the best manner, the difference will be greater than we have designated. If, however, the plow turns the sod over in a solid mass, leaving it hard like an unburnt brick, fig. 127, its bulk will not be increased, although large vacancies may be found under it. A sod that has recently been laid down to grass and treated only as a meadow will still possess much looseness of soil, and be less increased in bulk by

Fig. 127.—*Sod turned without Pulverizing the Surface.*

Fig. 128.—*Sod turned with a good Pulverizing Plow.*

plowing. But under ordinary circumstances, the figures we have given will not greatly vary from actual results.

Other qualities in the plows being equal, the one which will increase the bulk of the inverted and mellowed furrow-slice to the greatest degree, will be the most desirable implement. There are, however, other requisites of a good plow, such as easy draft and a perfect inversion and turning under of any weeds or rubbish which may be on the top. When the farmer finds these all combined in a well made implement he need not hesitate to adopt such plow for use.

Experienced and observing farmers are familiar with the facts we have explained in the preceding remarks, but we still find many cultivators of the soil who have given them very little attention, and who have not examined the difference between doing such work in a superficial and in a perfect manner.

Remedies for Smoky Chimneys.

Chimneys often smoke because they are too large at the top, turning the current down the flue like a funnel. This difficulty is easily remedied by rebuilding the top and drawing it to a taper. Fig. 129 shows an objectionable form to the chimney top—fig. 130 the approved form.

Fig. 129.

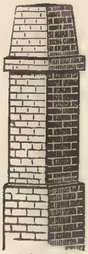


Fig. 130.

Fig. 131.

Fig. 132.

Sometimes a double or triple chimney is made in the same objectionable way, as in fig. 131. The smoking of such a chimney as this may be remedied by giving it a shape like fig. 132. From chimneys made in this improved form, the current at the moment of escape is swifter than below, and less acted on by any downward blast of wind, at the same time that the exposed surface of the orifice is smaller on which the wind can strike the ascending current, as shown in the section, fig. 133.

Fig. 133.

For a small stove chimney, we have never found anything to exceed the sheet-iron cap shown in fig. 134. It was placed on a low chimney, where high roofs around made many

conflicting currents, which sometimes blew the flames out of the stove below in streams into the room. After this cap was placed in the top of the brick flue, it never smoked again—and not only so, but it always drew with a strong current whenever there was a wind, fire or no fire. The arrows in the section, fig. 135, show the currents, the diverging

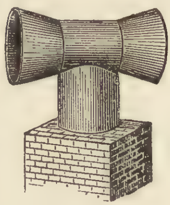


Fig. 134.

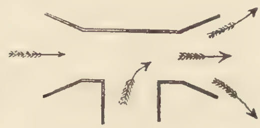


Fig. 135.

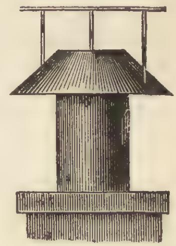


Fig. 136.

direction of which, on the lee side, produces actual suction, drawing the air upward in the pipe.

Emerson's chimney-cap, although quite different in construction, operates on the same principle, fig. 136. The cap prevents the wind from striking the top of the chimney. Between the cap plate and the sloping rim there is a contraction and expansion of space similar to that shown in fig. 135.

Convenient Implements.

Miles' Stone Lifter.—In addition to its compact form, this lifter has the merit of economy, in using for the machinery the cast-off wheels of old mowing machines, and the wheels of a strong lumber wagon. The whole is easily managed; it will lift stones weighing three tons, and will clear land rapidly. At our request Mr. Miles, the inventor, has furnished us a sketch, from which we make the accompanying engravings. Fig. 137 is a side elevation, showing the wheels of the wagon, the reach being removed, so as to allow the stone to swing clear, the side timbers, which sustain "the power," being braced so as to connect the forward and rear wheels. We suppose these timbers to be made of trees having a natural crook. The main wheel is the driving wheel of a single-wheel cast-off mower—the motion being reversed by applying the moving power on the crank to which was attached the cutter-bar—taking away the shaft of the main driving-wheel and

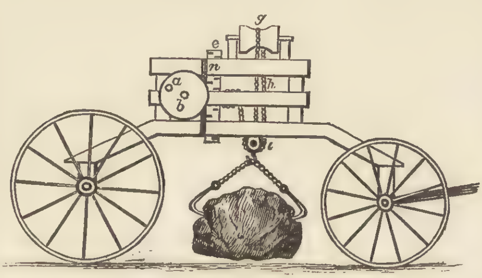


Fig. 137.

replacing it with a larger one, 3 inches in diameter, and 26 inches long. The crank on which the workman operates to lift the stone performs a circle 16 inches in diameter, twenty-four revolutions of which give one revolution to the main shaft, on which the chain winds, lifting the stone. But instead of carrying the chain directly to the stone, it is passed under one sheave and over another, and then attached to the block of the first, by which the power of the chain is tripled as it leaves the shaft it winds on. In addition to the explanation given by fig. 137, a plan of the frame and machinery is shown by fig. 138, the same reference letters applying to both figures—*a*, crank piece, on which the workman operates; *b*, disk of wood or wheel, 16 inches in diameter; *c*, bevel pinion, mashing into *d*, bevel wheel, the axle of which carries a pinion inside the main wheel *e*, which works into the inner cogs of the main wheel—the latter 30 inches in diameter; *f*, shaft, 3 inches diameter; *g*, stationary pulley; *h*, chain; *i*, free pulley, below the main shaft; *k k*, frame of old mowing machine, 39 by 51 inches—timber 6 inches square. The crank-piece *a* makes 23½ revolutions to one of the main wheel *e*. Three revolutions of the main wheel raise the stone 13 inches. At *l* is a dog, catching against the projections of main wheel; *n*, brake. The side pieces are 10 feet long and 8 by 3 inches. The wagon wheels are 6 feet apart, the hind wheel 5 feet in diameter, and the forward one 4½.

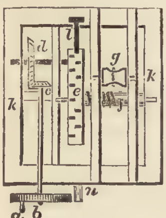


Fig. 138.

DIGGING POST-HOLES.—A much better post-hole can be made with an auger than with a spade. The auger leaves the hole round and straight, and the earth around the top unbroken. Half the holes dug with a spade are of irregular shape, and flaring. All the earth must be put back, and so considerable time is wasted in tramping it down again. I have dug holes with an auger and fitted the posts so close as to need no tramping at all. Any good blacksmith can make a post auger. The shank is made of three-quarter inch round iron, and 3 feet long. The head is 8 or 9 inches in diameter, with two cutters or lips, dividing it into two equal parts, and should be made of quarter-inch iron, with a hard cutting edge to the lips, which are turned up about an inch at the outer edge, or half the width of the throat. The throat should be 1½ inches wide, to let through small stones without clogging. There need be no thread on the point like a wood screw, as it soon clogs up with earth; all that is necessary is a simple point 3 or 4 inches long, of a true taper.

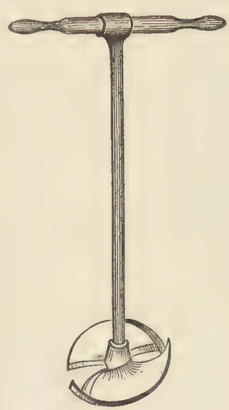


Fig. 139.

A wooden handle, two feet long, passes through an eye in the shank. Throw off the sod with a spade and bore in 6 or 8 inches, and pack the earth a little on the auger. If the earth is dry, it will fall back into the hole when the auger is taken out unless packed down. This is only necessary in sandy soil or loose loam; heavy clay soil would be apt to stick to the auger. If one buys one of these augers at a hardware store, it will cost him $4 or $5; a blacksmith will make one for $2 after the pattern shown in the annexed engraving, fig. 139. F. GRAVES.

STUMP PULLER.—There is a stump machine manufactured in Bradford Co., Pa., that will pull any stump except green ones. It has the advantage of three powers and using a post to pull over, giving it more power. We use first a chain, with two take-up hooks, with a swivel in each. Then we use iron rods, with a hook on one end and a link on the other, to reach out to the stump. We have rods and chain enough to reach about 12 or 15 rods from the lever. I send a sketch of the machine. JOHN E. DODGE.

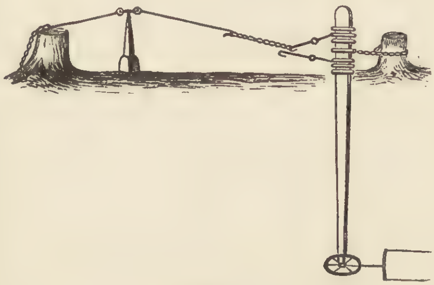


Fig. 140.

AN INDIANA DRAG.—An Indiana correspondent of the Rural New-Yorker describes a drag he uses for covering corn, which is exceedingly cheap and simple in construction, and would be equally good we should think for the other purposes of a drag in pulverizing the surface of the land. As shown in the engraving, (fig. 141,) it is made of three rails, which are about 4 feet long, and made by splitting a log of 14 inches diameter into six pieces. The rails are attached about 9 inches apart, by scantling, the center piece of which projects 16 inches, with a hole to hitch the whiffletree on. In covering corn, dropped 3 feet 9 inches each way, the horses straddle the row; a boy stands on the drag to drive, and can go over about eight acres a day, it is stated.

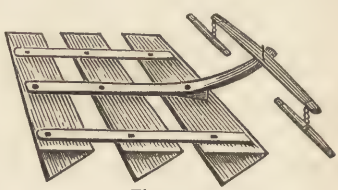


Fig. 141.

TWO GOOD SHEEP RACKS.

DEFOREST'S.—Make it any length you please. Each foot in length will accommodate two sheep of ordinary size. The posts should be 2 by 4 or 3 by 4 joist, hemlock or some other kind of wood that will hold a nail. The

boards may be of pine or hemlock, if you please; only plane up the edges and corner them well, so as to protect the wool from being pulled out of of the sheep; four pieces of joist 37 inches long for the posts, four boards 6 inches wide, two ditto about 8 in. wide, two about 11 inches, make the long stuff; then

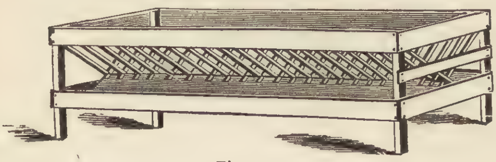


Fig. 142

you want short pieces for the end, 6 inches wide, three on each end. The slats are about 22 inches long by 2½ wide; they cross each other so as to form a space between, 2½ inches wide. You will find that all the fine feed that drops through the slats will be caught in the trough, and finally will be eaten up clean by the sheep. You have also a trough amply sufficient from which to feed grain, oil meal, salt, roots or anything you please. For economy in fodder, protection to the wool on the neck of the sheep from dirt, &c., this style of rack, for its compactness, lightness to handle and durability, has the preference in my judgment to any I have ever seen. Only try one, and I know you will be pleased with it. JACOB J. DEFOREST.

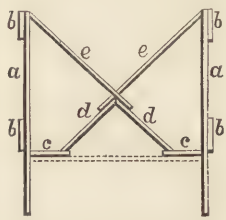


Fig. 143.—*Section of Sheep Rack—Height,* 37 *inches; width,* 31 *in.; a, space* 12 *in. wide; b b,* 6 *in.; c c,* 7 *in.; d d,* 10 *in.; e e,* 2¼ *in. wide and* 22 *in. long.*

HATCH'S.—The requisites of a good feed-rack are: 1st. The sheep should come to it on one side only; 2d. One side should be accessible for putting in the feed; 3d. The front of the rack or side from which the sheep feed should be perpendicular, and the back slant so the feed will always fall against the rack in front, that it may be easily taken by the sheep, and no possibility of dirtying the wool; 4th. A trough to receive the litter from the hay, and one in which grain or roots may be fed. This trough should be movable, so as to be turned over for cleaning it when necessary. These requisites are found in the style

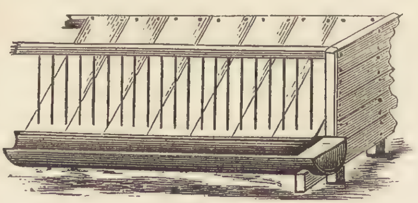


Fig. 144.

of rack of which I send a sketch, (fig. 144.) The feed, whether grain, hay or roots, is fed from the back side, which is intended to be inaccessible to the sheep. The small feed will fall down into the trough in front. This

trough rests in a piece fastened to the end of the rack, leaving the trough loose for cleaning, &c. As a precaution for preventing hay being thrown over the front on the sheep, the front may be raised higher and boarded close, leaving only sufficient height of opening in front for the sheep to take the feed. If desired, two of these racks may be set back to back, with a space between. A. L. HATCH.

MISCELLANEOUS SUGGESTIONS.

SPLITTING WOOD.—In large portions of the country, farmers still burn wood as a fuel, and some of them consume much time needlessly in splitting it for the stove, being compelled to stoop at every blow of the axe and pick up sticks by hand. The accompanying figure (fig. 145) represents a very simple contrivance for holding each block after it has been sawed, until by successive blows of the axe the whole is reduced to small pieces, without the necessity of stooping over to pick up each stick separately. In the absence of a hollow log, from which this is made, the jack or wood-

Fig. 145.

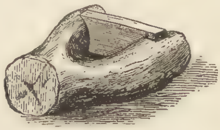


Fig. 146.

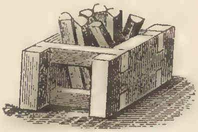


Fig. 147.

holder may be constructed in other ways, one of which is to select a forked log, and set in a thick piece across, as shown in fig. 146. The space in the fork may be cut out larger, so as to give the opening a rounder form. Fig. 147 shows one made of thick plank or flat timber, in a more compact shape, the two side-pieces being secured together at the top and bottom by short pieces of stout scantling halved or dovetailed into them, and spiked in their places. A simple jack of this kind may last several years, and save many days' work every winter to the farmer who saws and splits short wood, and who, in addition to keeping the cooking stove in operation the year round, has one or two other fires for heating rooms during winter. It will be observed, in constructing these contrivances, that they must be heavy and solid, so as to keep their places, and not to be thrown about while in use, and to be firm enough to withstand the heavy blows to which they will be occasionally subjected.

SELF-SHUTTING GATE.—A flanged pulley is fastened to the back top part of the gate, concentric with the hinges, as shown in the sketch, (fig. 148.) As the gate is opened, the pulley turns with it. Fastened to the circumference of it is a rope passing from the inside of it back horizontally, and then downward over the pulley on the fence, as shown. To the end of the rope is attached a suitable weight. As the gate is opened, the weight rises, and the pressure teuding to close the gate is uniform, no matter how far

it may be opened, or how nearly closed. If the pulley on the fence is farther back than shown in the sketch, or if the weight is arranged to fall on the inside of the fence instead of being as represented, the gate may be thrown entirely open, and the shutter will act just as readily, being always in line. It is cheap, simple, effective, durable, and not liable to get out of order. A. L. HATCH.

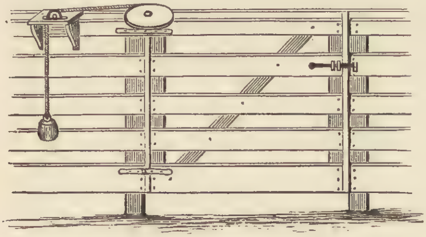


Fig. 148.

RAISING LARGE TREES.—I have been taking up some large Arborvitæs to-day, and have had such good success with a very simple contrivance for the purpose, that I think some of your readers might profit by the method. It saves much labor where trees are large and firmly rooted, and when the "ball" is to be preserved. My trees were 15 feet high, and were removed with as much earth as three men could lift. The enclosed sketch, (fig. 149,) explains the operation. Plow a cut down each side of the tree. Chamber under a little with the spade on one side. Erect the lever—(I used an oak scantling 4 by 6, and 16 feet long.) Insert a wedge on top of the lever, (or an iron bar,) and with a heavy sledge drive it well under the tree. Then raise the lever and block up under it. Then put the lever in action, and the tree is out with good ball and roots. Probably a broad wedge, armed at its chisel point with iron, would be best, but I used what was handy. TAPE LINE.

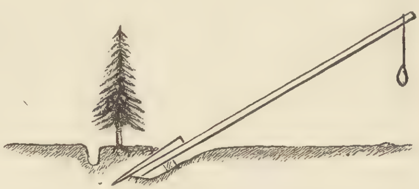


Fig. 149.

KICKING COWS.—A few years ago I had considerable experience with kicking cows, and by far the best remedy out of quite a number that I tried, was the strap or surcingle drawn tightly around the cow just in front of the hips and close to the bag. Tighten it up till she does not attempt to kick. I never knew it to fail; you can gradually loosen it until it will be sufficient simply to lay it on her back. But be cautious and do not loosen or leave it off until she makes no effort to kick with it tight or on. Kick she *cannot* with the strap tight. The first cow I tried it on was the worst I ever saw. With both hind legs tied together she would kick backward like a horse; then, in addition, one fore leg was tied up, and she would stand on the other and kick with both hind ones, as soon as an attempt was made to

milk her, till she tumbled down; then would get up and kick again until tired out; so the milk was generally left on the stable floor, and it was decided to dry her up and beef her as soon as possible, though an extra cow. Seeing the surcingle remedy in the COUNTRY GENTLEMAN, I tried it and effected a cure. C. H. S.

KEEPING GRAPES FOR WINTER.—The first requisite is to have plenty of good, well ripened fruit. They should be sufficiently matured to have plenty of rich juice, but not over ripe. When grown on crowded, unpruned or uncultivated vines, the fruit will be small, acid and watery; these will quickly shrivel in a dry atmosphere, and mould and decay in a damp cellar; or if placed in a cool upper room to avoid these disasters, they will not withstand much frost, but quickly freeze. The next thing is to keep them at as uniformly low a temperature as may be practicable. A cellar is commonly too warm and too damp, although some with cemented bottoms and sides, and well ventilated, are free from this objection. An upper room, where there is no fire, and where the temperature does not go far below freezing, is well adapted. Grapes keep well in shallow boxes, without packing, well covered with lids. Care should be taken that they are perfectly clean, and free from all defective berries, and the outside must be quite dry. One of the most successful grape keepers in the country regulates the temperature uniformly at 28° Fah., and he sometimes keeps them in good condition into the following summer. Dry maple leaves, cotton batting, baked maple sawdust, &c., assist in keeping the temperature more uniform and in absorbing moisture, but are not absolutely essential to success.

CUTTING TIMBER—Where a succession of growth is not desired, cut the trees at midsummer, split or saw into posts immediately, and place them where they will dry rapidly. The great point in preserving durability is to season quickly, before any fermentation or partial decay begins in the log. All other notions about the best time for cutting are merely fine-spun refinements. The best way to make the posts last long is to set them in ground the subsoil of which is constantly well drained. Over an underdrain is a good place. Posts soon rot in a soil often water soaked. A coating of hot gas tar to the part under ground is useful; or thrusting the lower ends, for a few minutes, into a large boiler filled with hot gas tar.

SWEET SCENTED FLOWERS.—Many cultivators of ornamental plants desire especially to raise those which produce fragrant odor, particularly for bouquets, stands and flower vases. In answer to occasional inquiries, we name the following sweet scented flowers, to which some of our readers may add others: Sweet Violet, Hyacinth, Heliotrope, Pinks, Sweet-scented Candytuft, Woodbine, Sweet Briar, Cabbage Rose, Tea Roses, White Lily, Sweet Alyssum, Mignonette, Sweet Pea, Carnations, Sweetwilliam, and several sweet scented Perpetual Roses. Here are enough to fill a room or garden with perfumes rivalling the "odors from the spicy shores of Araby the blest," if well managed and cultivated.

THE

ILLUSTRATED ANNUAL REGISTER

OF

RURAL AFFAIRS.

COOKING FOOD FOR ANIMALS.

Crops and Barn Arrangements for the Purpose.

THE INCREASING INTEREST felt among intelligent agriculturists in relation to cooking food for domestic animals, and the great success with which some enterprising managers have introduced the practice of feeding steamed fodder, have induced us to visit several establishments where steaming has been adopted, and to furnish our readers, on the present occasion, a statement of some of the observations made. For farms of moderate extent, and where the owners or managers desire to reduce the care and labor required for the animals kept upon them, it will be hardly advisable to attempt this part of farm economy; but on larger farms, where the proprietors aim to have everything done in the best as well as most economical manner, and where one or more careful hands must be kept employed, we would strongly recommend the adoption of the practice, on the ground of saving food, increasing the milk of dairies, and more especially

for the increased health and thrift of the animals where a regular supply of cooked food is given them from the close of autumn pasturage until a full supply of grass can be furnished in the spring.

Experiments of William Birnie.

Through the kindness of William Birnie, Esq., Springfield, Mass., we made a visit to his farm establishment, where he first adopted the practice of steaming in the year 1858, and has now continued it, with entire success, for fifteen years. The farm on which these experiments have been made contains only fifty acres, but he has obtained enough food for fifty cattle, with the exception of the pasture, most of which is on another place. By cutting and steaming hay and other fodder, including cornstalks, straw, &c., he saves one-third of its value, so that two tons will last as long as three tons fed in the common way. But this is not all the gain effected. The cows are kept in better condition, remain perfectly healthy, and give as much milk through winter, and as good in quality, as in the best summer season. The food is fed warm to the animals, thus preventing the loss otherwise required to sustain animal heat; digestion is facilitated, and they do not have to work hard in chewing dry and tough fibre. When he has suspended the feeding with the cooked food, and given dry fodder for a single day, the milk has at once fallen off at least one quart for each animal, and some days have been required to recover the full flow again.

He cuts and steams twice a week, the food remaining warm and in good condition for three days, a slight fermentation sometimes commencing after the third day in warm weather. The steam is generated in a common vertical engine boiler, which is about 6 feet high and 2½ feet in diameter, and cost when new a hundred dollars (fig. 2.) Second-hand boilers that will answer as well, may be had for fifty dollars. The water is let in at the bottom, and the steam passes out through the pipe at the top. The fodder is cut by a horse, by means of a tread-power, and two men are required, two hours twice each week, to cut and fill the steam vat. The fire is started in the morning, and the cutting is commenced at the same time; as fast as the chopped stuff is made, it is shoveled down into the vat, wet sufficiently as successive portions are deposited, and trodden down compactly. Two hundred gallons of water are required for the contents of the vat, which is in the basement, and of brick, six feet square inside, and eight feet high (fig. 3.) Mr. B. would line this vat with sheet-iron, so as to give a higher pressure of steam. A large side door, *A*, allows the cooked food to be shoveled out and fed to the animals, the stalls of which face the vat as a common centre. Three or four tons of coal are sufficient to do

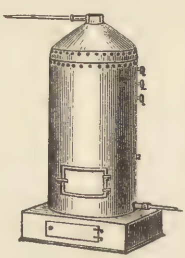


Fig. 2.—*Steam-Boiler.*

the cooking for the winter, beside which the whole expense is the labor of the two men who do the cutting, which is equal to eight hours per week. An important saving, both in labor and fuel, is effected by not cooking every day, as but little more is needed for the larger quantity of steam.

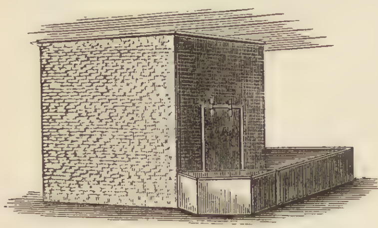


Fig. 3.—*Steam Vat, built of brick. Door opens at top for admission of Cut Fodder, and another at the side for shoveling it out into the trough in front.*

Fig. 4 represents the plan of the lower story of the barn, 50 by 75 feet, which is walled in stone on one side, nearly all the rest being double boarded, and all the dampness so frequently resulting from walled basements is avoided. It is 8 feet high in the clear. This story will hold more than fifty cattle, of all ages. The root cellar, R, never freezes, being walled with masonry on three sides, and opening to the cattle apartments on the fourth. The boiler room B contains the water hogshead *h*, which supplies the boiler *b*, from which the steam passes in a pipe overhead, as shown by the dotted line, to the vat V, passing down near the bottom and extending across and around it, the steam escaping through perforations 6 inches apart.

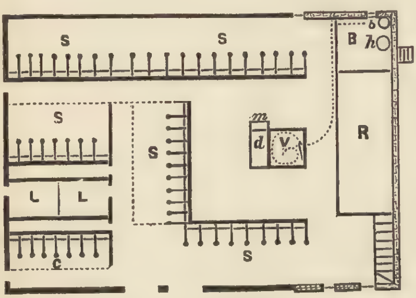


Fig. 4.—*Plan of Basement*—B, *boiler room*, 12 *feet square*—h, *water hogshead*—b, *boiler*—R, *root cellar*, 12 *by* 24 *feet, holding* 1,400 *bushels*—V, *steam vat, connected with boiler by pipe overhead, as shown by dotted line*—d, *door opening to open feed box in front, and connected with meal chest*, m —S S S S, 43 *cattle stalls*—C, *calf stalls*—L L, *two loose boxes*, 10 *feet wide.*

The food, after undergoing cooking by steam, is withdrawn from the vat through the door *d*, and easily carried over the brick floor which surrounds it, to the mangers of the cattle, which face it on three sides.

One-half of this story (at the left in the plan) has a manure cellar beneath it, 35 by 50 feet, mostly under the stables; and the passages being newly laid with plank, which are not spiked down, any one is easily lifted for shoveling down the manure. The few stalls which are not over the cellar are readily cleaned by the use of the wheelbarrow. Different materials for floor have been tried, and plank found the best.

The stables are littered with sand, one load of which is drawn daily from the sand-pit, near at hand, for this purpose. The manure is consequently

all short and fine, and is preserved from the wash of rains by the shelter thus afforded. The straw is saved for cutting and mixing with the food.

The cattle stables are 12 feet wide, the stalls about $3\frac{1}{2}$ feet wide. Fig. 5 is a cross-section of the stalls, showing the 2 feet passage at the left; the 2 feet gutter, 4 inches below it; the platform on which the cow stands, 6 inches above this, and the manger on the right, $2\frac{1}{2}$ feet wide. The cows are secured by a strap and chain, sliding up and down the upright post. The depth of the gutter prevents them from standing in it, and they do not lie in their manure.

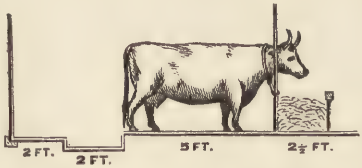


Fig. 5.—*Cross-section of Cattle Stall.*

Fig. 6 is a plan of the upper story, containing the fodder, meal, water tank, &c. A tread-power cuts all the fodder, which is shoveled into the vat below, as already described.

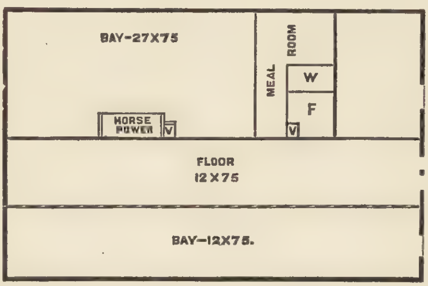


Fig. 6.—*Plan of Upper Story.*

The engraving at the head of this article is a view of the barn.

The stables do not freeze in winter, being surrounded with a double plank exterior, while the heat of the steamer and vat, and the warmth imparted by so many animals, keep up the temperature.

Water for the cows is brought in pipes, and is accessible at all times to them in front of their mangers.

All the doors run on rollers, and no space is encroached upon by swinging doors.

Refuse slops are warmed by the steam from the boiler, and rendered better and more agreeable to the animals.

The roots, which are mixed with the food, are cut with a machine driven by horsepower, which has cut 25 bushels in four minutes. It is made by Whittemore & Belcher of Chicopee, and tears rather than cuts, leaving a softer food.

THE CROPS AND MANAGEMENT.

The farm on which these animals are kept and fed contains only 50 acres. About 10 acres are in pasture, where the cows are turned after milking in the morning, and allowed to remain until 11 o'clock, when they are again

brought to the stable and fed with green clover or cornfodder, as the case may be, the window shutters being closed, so as to darken the stable and keep out flies. About 4 acres are sown with fodder corn, 3 bushels per acre, in rows about 2 feet apart, and subjected to horse cultivation. Three acres are in clover, which furnishes the first available food for soiling ; then grass and corn. Alternating or mixing is found to answer best, as corn, when fed alone as fodder, is found too relaxing, and hence a feeding of dry hay or wheat bran is occasionally given. The cows when in milk are soiled, being fed from the crops named. Dry cows, young animals and sheep are pastured on a farm six miles distant. The whole of the hay and fodder for the winter feeding is cut on the home farm. Any clover or cornfodder left from soiling is dried for winter use. When drilled fodder is well dried it is found equal to the best hay. Nothing is better than green or well dried clover for making milk.

Of the three acres of cabbages, a part is sold in the city markets, and the rest fed to milch cows after the frost has killed the grass. The meadow land being kept in the highest condition, the cows are pastured in it to some extent after corn is killed by frost. No crop tried on this farm gives such good results as cabbage for feeding green to cattle, greatly increasing the flow of milk, as well as adding to the flesh. They usually fatten rapidly when fed freely on cabbage, and a larger amount of food is obtained from an acre with this than with any other crop.

The following are the number of acres for each crop on the fifty acres :

Pasture,	10	acres.
Meadow,	20	do.
Fodder corn,	4	do.
Clover,	3	do.
Cabbage,	3	do.
Roots,	3	do.
Tobacco,	4	do.
Buildings, &c.,	3	do.
	50	acres.

No grain is raised, but meal is bought (for feeding with the steamed fodder) with the avails of the sale of cabbage and tobacco, and the income of the place is derived from the milk and the sale of Ayrshire cattle, which is the only breed raised, and of which there are about 50 head, of all ages ; 20 or 25 are cows, and the rest younger animals of various ages, beside 20 Cotswold sheep, and 4 horses. One of the Ayrshire cows, from the excellent food given, gave its weight in milk in 25 days.

Experiments of B. A. Avery.

In the arrangement already described for cutting and cooking food, there are some disadvantages. The feed is cut by a separate horse-power ; the steam is raised for the special purpose of cooking, and after the steaming is completed there is a loss of the remaining heat. These difficulties are obviated by employing a small steam engine to cut the fodder, and then turning on the steam from the boiler to do the cooking, allowing it to expend all the remaining steam, which would otherwise be wasted, for this

purpose. One of the best contrived systems which we have met with for affording all the facilities desired, is on the farm of B. A. Avery, near Syracuse, N. Y.

This farm is chiefly devoted to the milk business, 60 cows being constantly milked to supply the city. The number of animals kept on the place is over a hundred. The farm contains 200 acres, over 180 acres of which are capable of cultivation.

The number of	acres in	pasture is,	60
do.	do.	corn,	25
do.	do.	hay,	95
do.	do.	potatoes,	1
do.	do.	mangold wurzel,	2
do.	do.	cabbage,	1
do.	do.	stumps, waste land, &c.,	16
			200

A large portion of the pasture is permanent and never plowed. The number of animals at the time the place was visited was: 65 milch cows, 18 two-year old heifers, &c., 18 one-year old, and 9 horses—total, 110.

The simple rotation adopted on this farm is as follows: First, corn, 2 years; second, "get back to hay the shortest possible way," usually by wheat or oats. Better still, is to prepare the ground in autumn for meadow by plowing, and harrowing smooth. Early in spring, or just as the snow is leaving, it is seeded with clover, or such grass as is desired, *heavily;* and in August a good crop of grass is cut, equal to the crop the next year after wheat or oats.

The annual yield of the meadow is about 3 tons per acre; the meadow land is usually plowed once in 8 or 10 years, and seeded to timothy and clover.

Corn Crop.—This is not raised for *husked* corn, but for feeding stalks and ears together. It is planted 2½ or 3 feet apart each way, and cultivated both ways. It is cut up and secured on the ground in large, well built shocks. (Mr. Avery thinks that corn in drills would give more corn and fodder per acre.) These shocks are drawn in as wanted, cut up and steamed daily for the cattle. The supply usually lasts till some time in March or April. "In this way," says Mr. Avery, "the husking, stacking, moulding and waste are all saved, and the fodder kept bright and sweet. *This is the only way I can pay expenses, and have a dividend left for the owner of the farm.* To think of keeping 50 head of cattle without cooking food, which would lessen so as to be a loss of 33 per cent., would be a return to antediluvian practice."

Steaming Food.—Mr. Avery has pursued the practice of steaming cut cornstalks and other food, for six years. We found his animals (at midwinter) in high condition. Some become too fat for milk, and are sold for beef. Out of his large herd only two animals died in four years, two very old animals. Since he commenced steaming, there have been no cases of milk fever, which was frequent before. His animals partake largely of Ayrshire blood.

Quantity of Milk.—By keeping constantly an accurate account, he

finds the milk to average 6¼ quarts daily the year round from each cow, or more accurately, 2,281¼ quarts a year from each. Before cooking, the average was about one quart per day less. The yield would be larger from old cows, but as there is a constant succession of young ones, the average amount is not so great as otherwise. A cow does not reach her best until 5 years old. He sold 130,000 quarts last year, and 135,000 the year before. The cows "come in," as nearly as may be, equally at all times of the year, so as to give a uniform supply of milk to the city.

AGES OF THE ANIMALS.—The herd of sixty milch cows, which is constantly kept up, is maintained by a yearly succession, there being always ten cows 2 years old, ten 3 years old, ten 4 years, ten 5 years, ten 6 years, and ten 7 years old.

Those which prove valuable for beef, which are not wanted, or are growing old, are sold off, and in this way from $1000 to $1200 worth of cattle are disposed of each year.

FEEDING.—This is usually commenced on the 1st of September by giving sown corn, (sown thick in drills,) and on the 1st of November the cows are put into the barn to feed regularly. One good two-horse load of stalks with the unhusked ears is drawn in daily. A very strong cutting machine, driven by a four-horsepower engine, cuts them up, ears and all, an inch long, about one hour being required for cutting the load. This is done on the barn floor above the basement, which holds the engine. They are then easily shoveled down into the steam-box below, having been previously wet with a sprinkler from a large wooden cistern immediately above, (the water of which is kept from freezing by the heat of the fire, boiler and steam,) at the rate of 14 quarts of water to 5 bushels of cut stuff. When stalks with the corn husked are used, 6 pounds of shorts are added.

No more coal is then added to the fire, and all the steam is at once turned from the boiler into the steam-box. This box is 8 feet long, 6 feet wide and 6 feet high, and has a cubic capacity of 288 feet. It is made of 2-inch plank, tongued and grooved together, fastened with clamps 2 feet apart and tightened by wedges, so as to shut closely, although a little steam was seen constantly escaping. The steam is conveyed directly from the boiler in a 1½ inch pipe, to the bottom of the steam-box, and discharged through a perforated steam pipe all through the feed. The escape steam from the engine is also used to cook with, and is quite as useful as any. When the engine is cutting, a pressure is kept up of about 60 pounds on the square inch, but while cooking it is better at 30 pounds. The pressure in the steaming box is much less, from condensation and escape. A door in the end of the box is hung on hinges, against which the car for conveying the food is run, and filled by shovels. Another door in the top (a sort of scuttle-hole) admits the cnopped food for steaming, which has been previously sprinkled on the barn floor.

The motion is given to the cutter by a belt from the fly-wheel—a small shaft also pumps the water to wet the feed and water the cattle. The

engine is also used foı sawing wood, threshing grain, turning grindstone, and making itself generally useful. The whole expense of all the machinery is about $600. It is capable of feeding 100 to 300 head of cattle, according to the size of the steam-box. A Daniels cutter is used, and will cut cornstalks in the bundle, or hay, at the rate of a ton per hour. If a fork-handle or broomstick happens to get in, it is chopped up, and so strong is the machine that nothing gives way or is broken.

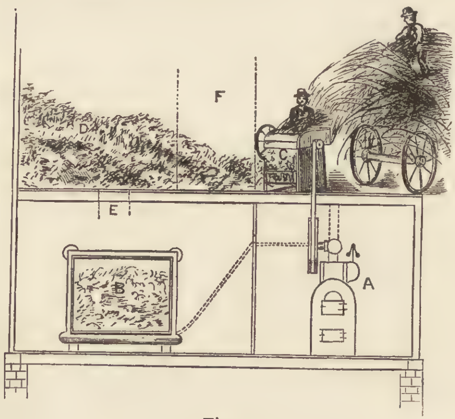


Fig. 7.

The sectional view (fig. 7,) although not an accurate representation of the arrangements of Mr. Avery, shows the general position of the various parts ; the basement containing the boiler and engine A, and the steaming chest B ; and the floor above, with the cutting machine at C, the heap of chopped stalks at D, the opening at E for throwing down to the steaming box, while the dotted lines at F show the position of the cistern or water reservoir for supplying the engine and sprinkling the chopped stalks.

Fig. 8 is a plan showing the position of the different parts below.

The *usual daily routine* is to draw in a load of stalks, and start the engine immediately after dinner, which cuts the stalks in an hour. The steam from the boiler is then turned in and begins the cooking, and with the coal already under it the steaming will continue through the afternoon, and more slowly through the night. Enough food

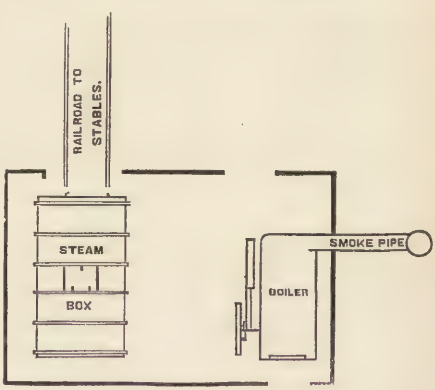


Fig. 8.—*Plan of the same in Basement.*

is thus prepared for the daily feeding of over a hundred animals. One hundred pounds of coal is sufficient for all this in one day.

When, in the morning, the animals are to be fed, the steam-box is opened, and a large box on wheels, holding 20 or 25 bushels, is run into it and soon filled with the cooked stalks by means of scoop shovels. It is then run on a railroad in front of the long line of cattle, and their mangers are supplied from it. The animals are secured in stanchions, which keep them cleaner than other modes of fastening, and they are allowed an hour's run each day in the open air, while the stables are cleaned.

VALUE OF THE FOOD.—When Mr. Avery began cooking, about seven years ago, he found that he saved $10 on the food of each cow, above the cost of additional attendance, which was $600 on the sixty cows. He thinks he saves more now. The milk given by them is as copious and as rich as when on the best pasture in summer. It is as rich as when they are fed with carrots. The same uniform supply continues the year round. The cut stalks, which when dry are stiff and harsh, become soft, sweet and delicious by steaming. The condensed steam, under the slatted floor of the steam-box, is strongly mixed with the juices from the stalks, and is used to feed calves, after being properly salted. The calves are never allowed to run on the fresh grass of meadows after mowing. Dry hay is fed twice a day to the cows as a change.

The additional expense of cooking the food, as compared with feeding dry stalks, is about as follows: Two men would be required to take care of the animals in either case, and one additional boy is needed for the cooking arrangements. The engine and boiler (the latter capable of six-horse-power steam) cost about $400. The three attendants, for the six months of cooking, are paid about $250 and their board, only a small portion of which is to be charged to the cooking.

No hay was sold from the place before the commencement of cooking; now about fifty tons are saved and sold yearly. Seventy-five head of cattle are pastured on the place. A saving of over $1,000 per annum is made in the food, above cost, beside the increase in milk, which amounts to more than 12,000 quarts annually, and to this is to be added the improved condition of the animals.

To sum up briefly, the 184 acres sustain an average of 115 animals, or one to every acre and six-tenths. Before the practice was adopted of cutting corn and stalks all together, about a thousand dollars' worth of shorts and meal were used in the place of the corn. Even then the cost of the purchase of the shorts was more than made up by the sale of over $1,000 in cattle. Before the cooking was adopted, it was necessary to expend $1,800 for shorts and meal. From our own rough estimate we conclude that the whole profits of cooking, by saving food, increasing milk, improving its quality, adding to the health of the animals, &c., on this farm, cannot be less than $2,000 annually, above the expenses of fuel, engine and boy.

The milk is sold in the city, and brings $5,000 as a yearly average. When

there is a surplus not sold, it is either sent to the cheese factory or made into Dutch cheese.

Mr. Avery remarked that his course of farming did not give him much straw; if he had it, he would chop it up with the stalks. He thinks that stalks with the ears on are rather better than sowed fodder, and the latter much better than the stalks alone, from which the corn has been husked.

There is an advantage from *cutting the stalks* which we have not yet mentioned. All the manure, whether old or fresh, is short, and may be easily and finely spread. There is no long manure.

Steaming Food and Farm Management by Wm. Crozier.

One of the finest examples of the rapid improvement of neglected land which we have met with is afforded by the large farm occupied by Wm. Crozier, on Eaton's Neck, near Northport, Long-Island. It contains 1,100 acres, of which 600 acres have been brought into cultivation. The soil is a sandy and gravelly loam, with some clay, and appears to possess much inherent fertility, which had not been appreciated until Mr. Crozier brought it out by means of his thorough management and excellent cultivation. The improvement has been so rapid that he has nearly doubled the amount of live stock in each successive year. He has now upon the place (May, 1873,) 99 head of cattle, 49 horses and colts, 120 sheep and 114 swine.

Great attention is given to the manufacture of manure; everything is saved for this purpose; litter and forest leaves are largely used, and the entire, winter of each year is employed in drawing muck for the manure heaps. These heaps, of huge dimensions, were seen on different parts of the farm, and one of them we estimated to contain nearly 500 two-horse loads. The whole amount of manure obtained annually amounts to several thousand loads. In addition to the application of manure, turning under clover is regarded as of great value, but the short time that the land has been occupied has prevented as yet so complete a system of clovering as an established rotation would accomplish.

All the feed given to the animals in winter, except a dry feeding at the middle of the day by way of change, is subjected to a thorough steaming process, after being cut short by means of a steam engine driven by steam from the same boiler. The boiler and engine house (fig. 9) is built of brick, standing a hundred feet from the barn; and has a seventy-barrel iron water tank on the top.

Fig. 10 is a plan of this building, the engine house on the right, and the workshop on the left. The engine house is 12 feet square, 4 feet under ground, and 12 feet above. The brick wall is a foot thick. The whole is surmounted by two tanks, each 7 by 14 feet, and 5 feet high. The engine pumps these full of water, which is brought from a cistern, a dug well and a drive well, the latter being as good as any, and very cheap. The water

from the tanks is led through a pipe to a large trough in the yard, saving much labor in pumping by hand, and running no risk of the animals' being neglected by the men. All that is necessary is

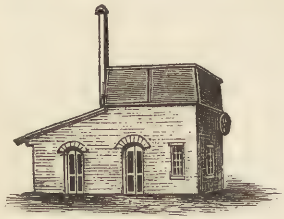


Fig. 9.—*Engine-house, one hundred feet from barn—Iron Reservoir on top—Band-wheel outside, carrying wire rope to barn.*

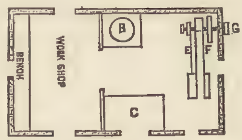


Fig. 10.—*Plan of Engine-house*—B, *vertical boiler*—E, *horizontal engine*—C, *coal bin*—F, *fly-wheel*—G, *band wheel outside.*

to turn a cock and see them drink. The steam is taken to the barn in an inch iron pipe under a shed, and the force of the engine is communicated

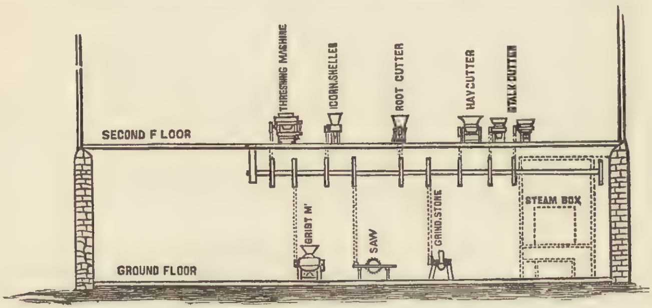


Fig. 11.—*Section of part of Barn, showing long horizontal shaft, which is turned by wire rope from engine, giving motion to the various machines above and below.*

by an inch endless wire rope. Prindle's steamer was used for three years, and answered an excellent purpose until the increase in the number of animals required more capacity, and a steam-engine to cut the fodder. The endless wire rope turns a long horizontal axle, (fig. 11,) on which are bands for driving the stalk-cutter, the burr-stone grist-mill, the corn-sheller, threshing machine and root-slicer. The mill grinds 16 bushels of feed per hour. The corn-sheller will shell as fast as two men

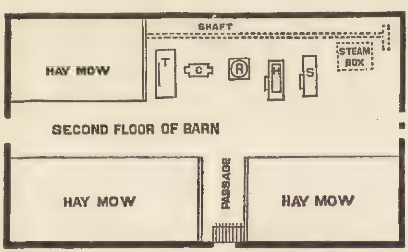


Fig. 12.—*Plan of Second Floor of Main Barn*—T, *threshing machine*—C, *corn sheller*—R, *root cutter*—H, *hay cutter*—S, *stalk cutter.*

can feed it with scoop shovels. The position of the different machines above is shown in the plan, fig. 12. The whole cost of engine and boiler, with all the machinery connected with it, was $2,200, and it requires for feeding all the animals, and cutting and grinding the feed, about a ton of coal per week. The cut fodder usually consists of one ton of cornstalks, one of hay, one of straw, and two of sliced roots, all steamed together.

FEEDING.—Mr. Crozier writes, January, 1873, "I am now feeding 4,200 lbs. of food per day, before cut or mixed, made up of 1,600 lbs. of cornstalks, 2,000 lbs. of mangold wurzel or turnips, 400 lbs. of oats, unthreshed,—as I am not a believer in threshing the grain from straw, for if either grain, grass or clover is left to ripen for the grain, the straw of either will not produce much fat, or bone, or milk, or butter, nor will the land be benefited.

"The cornstalks are cut with a No. 4 Daniel cutter; the oats are cut by a Telegraph cutter; and the roots are cut by Russell's English root cutter. The whole are mixed with 200 lbs. of wheat bran and 10 lbs. of salt. The whole is done in 80 minutes by four hands, which is equal to one man 5 hours and 20 minutes.

"There is an iron pipe leading from the tanks at the top of the engine-house into the steam-box in the machine barn, which brings a stream of water one inch in diameter, that runs on the feed while it is being put in the box. This mixture, when cooked, is drawn out from the box through a door 4 feet high and 3 feet wide, into the cellar of the barn, and from there put into a wagon and carted around the yard, and fed to each animal by means of bushel baskets, one man standing in the wagon to fill the baskets, while two more carry and distribute to the animals according to the size or weight of the animal, or its condition.

"I have fed three loads of good hay, which did not seem to satisfy the animals, each load weighing 1600 lbs. They went frequently to the water troughs, and seemed to drink nearly a barrel each. Now, when fed on cooked food, they hardly look at the drink. I have therefore come to the conclusion, after long examination, that much dry fodder in winter, and too much dry grass, are the cause of so many thin and feeble animals."

THE SLIP-SHOD PRACTICE.—"As a rule I make a journey each fall, and examine the various methods of feeding practiced by cattle breeders, or those who call themselves such, and find nearly all vary in their practice, and many poor animals receive hard treatment. The cows are milked in the morning for what little they will give, and are then turned into the yard to piles of dry cornstalks; at noon the same dry feeding comes again, and at the end of the day their third ration of coarse cornstalks, which, fed thus, I think of little value. The cow cannot get enough food, no matter how hard she works all day for it; one cow thinks her neighbor has the best and makes a poke at her, and she again pokes the third; and by the time they get through eating and poking, most of the fodder is well trodden under foot. Then comes the labor and annoyance of drawing this coarse stuff out of the yard, spreading

it and getting it plowed under out of the way, clogging both plow and harrow. This can never happen when all is chopped short."

Live Stock.—All the cattle kept on the farm consist of Alderneys, Jerseys and Ayrshires. We were struck with the beauty and perfection of many of these animals. Fig. 13 is a portrait of the Ayrshire cow Belle, which might be supposed an imaginary picture of an ideal milker, but we found on looking at this animal that it had been drawn strictly true to nature. This cow gave, in Scotland, it is stated, 36 quarts of milk in 24 hours, but Mr. C. said she had given only 26 quarts while in his possession. The milk is not so rich

Fig. 13.—*Ayrshire Cow Belle.*

as that of some others of his Ayrshires. Another had given 24 quarts. The smallest quantity from any of his herd, when in good milking condition, was 14 quarts.

The Alderneys and Jerseys are the best for butter-making, and if they do not actually give pure cream, it is so slightly diluted with milk as to afford large quantities of the finest butter. These animals eat more for their weight than other cattle, and furnish more butter from a given amount of food. A two-year old Alderney (from the importation of the late R. L. Maitland of Rhode-Island) gave 14 lbs. 7 oz. of butter from the milk of seven days. These results are no doubt largely owing to the excellent system of feeding and management practiced at this place, and especially to cooking food in winter. A Jersey bull, two years old, after the long and severe winter of 1872–3, was as smooth and symmetrical as at the most favorable season of the year, and as a friend remarked, he appeared to have been "turned in Nature's finest lathe." This animal stood at the head of the prize herd of Jerseys exhibited by Mr. C. at the Elmira State Fair in 1872.

BUTTER-MAKING.—The excellent feed given the cows, the daily steaming of their fodder through winter, the clean and comfortable shelter which they enjoy, together with the high milking qualities which these fine Ayrshires and Jerseys possess, enable Mr. Crozier to make, from the whole herd of milkers, one pound per day on an average for each animal throughout the whole year. This butter, which, after passing through the skillful hands of Mrs. C., partakes a little of the character of what is termed "gilt-edged," is sold for 70 cents per pound at wholesale. This is found to be more profitable than cheese-making or disposing of the milk in any other way, the milk yielding at the rate of no less than 10 cents per quart in butter,—the sour milk for pigs, the buttermilk, &c., more than paying for the manufacture of the butter. This kind of dairy husbandry does not exhaust the farm.

The dairy house is so constructed and furnished as greatly to reduce personal labor. The churning is done by horse-power, a single horse tread machine being used for this purpose, placed just outside the manufacturing room, and by means of a pitman driving a walking beam with an 80-gallon dash churn at each end, (fig. 14.) A butter-working machine works out rapidly and easily all the buttermilk with simple pressure. This machine is nearly represented by fig. 15, except that it is mounted on legs and stands like a table.

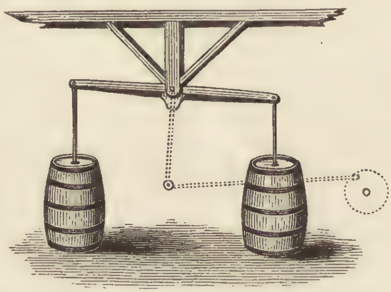


Fig. 14.—*Churn Worked by Horse-power—the dotted lines represent the pitman on the tread-power placed outside the building, which works the beam to which the dashers are attached.*

The adjoining milk room, which is 16 by 20 feet, is sunk partly below the surface, is furnished with shutters and wire gauze to the windows, has slatted shelves around the interior, and will hold one hundred and forty-four pans. The milk room is kept by the thermometer at a temperature of 60 deg., as nearly as practicable, by means of a stove in winter, and ventilating pipes through the ice of an adjoining ice-house in summer.

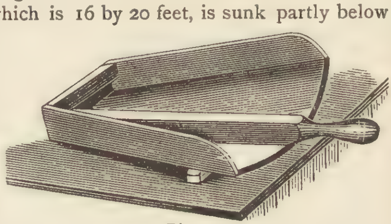


Fig. 15.

The milk is treated as follows : It is first strained into deep cans (20 inches deep and 8 inches in diameter,) and set into cold water to take out the animal heat, and it is then strained again into tin pans 4 inches deep and 15 inches in diameter at the top, which are half filled, or 2 inches deep, with milk.

Before the pans receive the milk they are rinsed in cold water, to prevent the milk from adhering to them. The cream is taken off every 24 hours, from each milking at a time, and put into an oak churn or barrel holding 40 gallons. At each skimming a little salt is added to the cream, and stirred thoroughly with a stick. When there is enough cream to fill the two 80-gallon churns nearly half full, the Indian pony is placed on the tread-power, and the churning commences. The butter is never allowed to come in less than 50 minutes, which is accomplished by means of a brake on the horse-power, which controls its velocity and causes slower churning. If the churning is done sooner, there is a loss in quantity and quality. When the butter is just ready to gather, one gallon of water to 40 gallons of cream is added, which assists in separating the milk by making it more liquid. It is then gathered by ladles and put into the butter worker. One pound of salt is added to each 25 pounds of butter, and also half a teacup of sugar. No water is ever used for washing it, which would carry off the sugar, as well as its perfect flavor; the hand never touches it in working. A sponge and cloth are used for absorbing the buttermilk when pressed to the outside. When the operation of working is finished, it is made into cakes or balls of one pound each, handsomely printed with a mould. Each cake is encased in damp muslin, and one hundred of these packed in an elliptical case 2 feet long and 20 inches wide, with successive shelves to hold the cakes, and with a space for ice at each end. Each of these cases sells for $70. A little over $600 worth of butter was made and sold in January, 1873. Such golden butter we have not often seen; it is eagerly bought at this high price, and customers who do not want poor butter say they "can't get half enough." The skimmed milk, with some cream still remaining with it, is fed to the calves, and is not lost—and such calves! The young Jerseys were pictures of beauty, and their eyes and faces look like young fawns in color. A very fine sight was that of the nineteen Jersey milch cows thrusting their heads, all in a row, through the stanchions into the manger in the open alley, for their fresh steamed food, which they devour with great eagerness.

BUILDINGS, CROPS AND FENCES.—The principal farm buildings are a large barn, 45 by 90 feet, and capable of holding a hundred tons of fodder, which also contains the machinery driven by the engine; a horse barn 125 by 30 feet; a cow stable 120 by 29 feet; cow shed made into a stable 135 by 18 feet; piggery 150 feet long, with a kitchen and cooking room; ranges of hog-pens 110 feet long, and of calf-pens (all covered) 90 feet long. The dairy and ice-house have been already described. A carpenter and blacksmith, each with his appropriate shop, do all the necessary current work with the improvements.

The crops on the farm are about as follow: 120 acres of oats, (which are cut up for steaming and not threshed,) 20 acres of barley, 40 of corn, 25 of cornfodder, 5 of potatoes, 10 of cabbages (for feeding) and 30 of turnips (White Norfolk and Aberdeen) for feeding off to sheep late in autumn

in hurdles. The barley, when good, yields about 45 bushels per acre, and Peerless potatoes have given 300 bushels. Eighteen work horses are required to do the work of the farm.

The fences are all straight; no crooked or worm fences are allowed. Post and board fence is the cheapest on the whole, although many are made of rails, laid straight and supported by vertical stakes. We observed that the furrows in plowing were generally within two feet of the centre of the fence, and a strip of land not more than four feet was occupied between the fields. The general neatness in the appearance of the farm, and the entire freedom from weeds and rubbish, are in striking contrast with most other farms.

At our request Mr. Crozier has furnished us the following details of his mode of raising and managing crops:

PREPARING THE LAND.—" As my belief is that manure is the mother of all crops, so it is the first step to farm with success. The more manure we make, the more crops we can raise; and the heavier our crops, the larger the manure heap. My maxim is to plow deep and manure well; cultivate thoroughly in dry weather, and never fear a poor crop. Begin to plow as early in the spring as the land is ready—never wait for a set day. I would much rather have my team plow an acre a day, or even less, than three acres skimmed over and half done. My rule for plowing is to cut a furrow 8 by 9 inches, for grain crops, on an angle of 45 deg.; for corn, turnips or mangold wurzel not less that 10 inches deep, and as narrow as the plow will take it up so as to turn it well over on its back. In addition to this, it is important to harrow thoroughly, to mix the soil as deep as it is plowed. I use the Scotch harrow, jointed into three parts, with 48 steel teeth three-quarters of an inch square and 13 inches long, often requiring three horses, when weighted to give it depth. After this I put on a chain harrow, to gather all weeds, roots of corn, &c., which may be left on the land. This rubbish is carted off and put into compost heaps.

FODDER CORN.—" This is sown in drills 2½ feet apart, with 3 bushels of seed to the acre. It is greatly superior if cut and cured properly, which is very easy to do. My method of raising cornfodder is to plow in the fall, either grass land or stubble, and harrow well the following spring; then put on a three-horse grubber, which will take 5 feet at each turn, put down 10 or 12 inches deep. Harrow again, and if lumpy, roll with a heavy roller, as I think the more you roll land, (more especially light soils, and heavy ones if dry enough,) the better.

STRAIGHT ROWS.—" I set up three poles, 8 feet high, one at the end where the plow starts and two at the other, in a straight line. The plow is an iron plow with long handles and short beam, which gives the plowman control over his horses, as he has the leverage, and not the horses over him. There is a marker attached to the beam of the plow, which marks the next furrow, as many inches from the present furrow as may be required. The first furrow must be *perfectly straight*—if not, the plowman must return and get it straight, which when once done the marker will keep

it so for the rest of the field. It is a great pleasure to go into a large field and see every row as straight as an arrow. It also saves time, for it is much easier to travel a straight road than a crooked one, and it is much lighter work to cultivate a straight row of corn. The work will also be more perfect when finished.

"When four or five rows are furrowed out, we commence manuring from the wagons, putting a good shovelful to every foot, and then take the back of a hoe, and level it off. Sow at least three bushels of white southern corn to the acre, (which is bought in New-York market,) and then cover with the plow so as to raise a good ridge. When the field is done I run a chain harrow over the top of the drills to level them off a little, and then pass a two-horse roller over all, so as to press the earth compactly to the manure. In a few days the corn will come up evenly, and present a beautiful appearance. I cultivate once a week until the corn is so large as to close the space between the rows, and prevent the horse from passing. I regard this cultivating as equal to a summer fallow. The corn is planted at different seasons from the first of May to the latter part of August, the first being used to soil the cows and hogs in summer, and will cut from 20 to 25 good two-horse loads of green fodder to the acre, which I consider equal to any three acres of grass or clover for soiling purposes. Cattle will do better on it, will give more milk, and young stock will grow faster, and look more thrifty, than on any hay or grass. This I have proved from time to time. I have turned out cattle to good after-growth of timothy and clover meadow a foot high, and they would leave it and seek the cornfodder. I exhibited a herd of Jerseys, soiled all summer on cornfodder, at the New-York State Fair of 1872, and took the first prizes in every class I entered, and a gold medal for the best herd, against heavy competitors, whose cattle, I was informed, were fed regularly with oil meal and wheat bran, and washed every day, and even had their tails braided!

Saving Corn Fodder.—"For winter use I save cornfodder as follows: The tops of the plowed rows already described, being nearly flat from the passage of the chain harrow and the rolling after planting, are rendered in good condition for the mowing machine. I put on a two-horse Clipper mower, taking two rows at a time through the full length of the field, and keep one man at every square or so; four men with forks will be back and out of the way of the horses on their return round the field. The stalks dry for a day or two and are then bound up in small bundles just large enough to feed the Daniel cutting machine. These are placed in large stooks, well bound at the tops, so that no wind can throw them down, where they remain till cured. There is no changing or handling until it is carted to the stock yard, which joins the machine barn and steam-box. Fig. 16 represents a platform of poles on

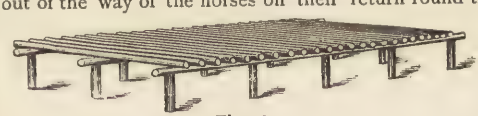


Fig. 16.

which the fodder is stacked, additional ventilation being secured by making chimneys by means of a barrel drawn upwards at the centre as the stack is built.

"This fodder corn, cut and cured in this way, and steamed, is of more value to me per acre than any two acres of the best hay, and pays more profit after paying for all the additional labor. My opinion is that one ton of cornstalks (common sort) cooked, alone, is equal to half a ton of good hay; one ton of cornfodder, (sown as described,) cooked, is equal to one ton of the best hay.

"There is no profit in cooking hay alone, unless to benefit the health of the animal, and to increase the milk. A ton of raw hay will go as far as a ton of cooked. But while feeding cooked hay, you will hear no coughing about the barn, or at the depot, as is usual. Horses, cows and calves fed on cooked food will have a healthier and more glossy coat, and a better general appearance, than if fed on raw hay, no matter how good. But horses will not stand a hard day's work as well as on dry food, nor will they trot in 2:40. Yet the horses on Beacon Farm, weighing from 1200 to 1800 lbs., and fed through the winter on cooked food, will work eight hours per day for six days in the week; will sweat easier—which, in my opinion, is no fault—but when put to the plow in spring, with a furrow 8 or 10 inches deep, for ten hours per day, rain or shine, then give them once a day a feed on dry hay and oats, with a good mash of bran to regulate the bowels.

"The cattle on Beacon Farm never get uncooked meal, and very little dry or raw fodder, unless a little hay once a day to chew the cud on, and I am satisfied they do better, and give more milk. We do not know of such a thing as abortion when it prevails. The calves are all healthy and thrifty animals. The hogs are all fed on cooked food, and are well known as prize animals at the fairs."

Rye for Early Pasturage.—In addition to the crops already mentioned, Mr. Crozier informed us that some of the most recently reclaimed fields had been brought into cultivation by first clearing off the bushes, and then inverting the soil with a strong team. In autumn, manure is applied heavily on the inverted sod, the land thoroughly and deeply harrowed and sowed to rye, which forms a dense growth of green by winter. This is used as sheep pasture early in spring, the green food at this time of the year promoting the health and thrift of the animals. A sufficient number are fed upon it to last till about the 10th of May, when the whole is plowed for corn, harrowed and furrowed, and the furrows filled with as much manure as they will hold, usually about 30 two-horse loads per acre, the surface of the manure smoothed or leveled with hoes in the trenches, and then covered about six inches deep with the plow.

General Management.—Mr. Crozier gives close personal attention to the operations of the farm, and has the work so well arranged into a system that a comparatively small number of men (ten or twelve usually—sometimes more.) carry on all the labor, and accomplish everything in

season and in the best manner, without hurry. The fine, high-priced, full-blood animals sold from the farm bring about $5,000 yearly; the butter rather more. These are the two principal sources of revenue. No grain or fodder is sold.

Operations of G. H. Wood.

In addition to the preceding information relative to cooking food for cattle, we copy the following facts derived from full experience, and furnished to the Country Gentleman by G. H. Wood, who constructed a barn 110 feet long and 30 wide, with a stone basement story, the whole arranged with special reference to steaming food for stock. He answers the objection that the services of a practical engineer would be required at high wages, by the remark—"My engine has been in almost constant use for over fifteen months without any such expensive adjunct as an engineer, and runs as smoothly, and does its work with as good economy of fuel, to-day as when first set up." The engine was made by Wood, Taber & Morse of Eaton, N. Y. The following is his description of the apparatus and its management, and contains some valuable suggestions :

The vat for steaming the fodder is located on the centre of the basement floor—the most convenient position to be filled with the fodder stored in the loft above, as well as to distribute the cooked food to the different animals stabled in the basement. The vat is built in the form of a two-headed cask, of the best quality of pine lumber, securely hooped with strong iron bands, and has a capacity of over 200 bushels, or about three-quarters of a ton of dry hay. The feed cutter stands in a room above, the cut hay from the cutter falling into a hollow cylinder two feet in diameter. This cylinder contains an upright shaft—carrying six fans just long enough to clear the sides—and is connected by bevel gear to a horizontal shaft, supplied with a pulley of suitable size to give it 400 revolutions per minute from the belt that drives the feed cutter. On the opposite side of the cylinder from the cutter, is a large hopper for ground grain. The flow of meal into the cylinder from the hopper is regulated by means of a shaker plate, similar to one used in a grist mill. The cylinder is supplied with water from a pipe connected with the feed pipe of the boiler. When the hay cutter is started, the water valve is opened just enough to give the requisite supply of water; the quantity of meal is gauged by the shaker plate; and the cut hay, stalks, straw, meal and water are mixed in the most thorough manner by the revolving fans, and fall into the steam vat below. With this simple apparatus one man can cut, mix and deposit in the steam vat a sufficient quantity to feed 80 to 90 head of cattle one day, in less than an hour.

A one-inch steam pipe runs from the dome of the boiler down to and across the bottom of the steam vat. This pipe across the bottom of the vat has a small hole punched in it every six inches, and capped at the end. This insures a good distribution of the steam. A false bottom, with space underneath for the circulation of steam, I consider entirely unneces-

sary. If one were using a kettle to steam with, that would not bear pressure, such a thing might be needed ; but with steam of a hundred pounds pressure there is no difficulty in penetrating the whole mass to be steamed, and blowing out the openings of the vat beside.

Portable engines are all constructed to use the exhaust steam in the smoke pipe for a blast. My chimney being so high, I do not require it for this purpose ; I have connected the exhaust pipe with the steam vat pipe, and furnished it with valves to turn the steam either into the vat or the open air. It is my custom, when the pipes in the vat are covered to the depth of a foot with the cut feed, to turn in the exhaust steam and let the process of cooking be going on while the feed is being cut. When the vat is filled, if there is grinding, wood-sawing or threshing to be done, the exhaust will fully cook the feed. I shall hereafter do the grinding for some of my neighbors, in order to have the feed cooked without the expense of using live steam. My engine is capable of grinding, to the usual degree of fineness, ten bushels of corn and oats per hour. Either the usual toll, or charge per hundred, would give a fair margin over the cost of attendance, fuel, wear of machinery, &c., so that the cooking of the fodder will virtually cost me nothing.

The cost of cooking, however, is not heavy ; the cost of raising steam from cold water is more than maintaining it when up, and consequently I should never advise any one to cook for a large stock without an engine. The amount of fuel used to cut the fodder, grind the grain, &c., would be but a small item, even if the exhaust is not used for cooking. The cooking can certainly be done more economically with an engine than a boiler alone ; for with the engine warm water can be constantly pumped into the boiler to supply the place of that evaporated, while with a boiler alone, the steam must be run clear down and the boiler refilled with cold water, which is a waste of both time and fuel.

My vat holds about three-quarters of a ton of dry hay. This is wet with not less than 100 gallons of water, and as much ground feed mixed with it as is desired to be fed. I have never succeeded in cooking a vatful thoroughly without evaporating at least 60 gallons of water in the boiler. This takes about two hours' time. If the engine is employed in driving machinery which requires its full power, the exhaust will cook the feed in three hours. * * * The food cooked by the exhaust is relished by the stock quite as well as that cooked by live steam. A piece of tallow about the size of a hickory nut, will lubricate the cylinder the whole length of the time the feed is being cooked. An ordinary family will consume ten times this amount of tallow in their breakfast of beefsteak. Some may think the quantity of tallow used in the cylinder too small. I can only reply that it has answered every purpose. The engine has been in constant use more than a year, and it has not yet become necessary to expand the piston.

I have had no conveniences in my barn to weigh accurately the fodder

and the animals, to note the saving of cooked over uncooked feed; but I do know that on the same quantity of hay and grain I keep more than one-third more stock than I did on uncooked feed. My cattle and horses keep in better condition, and the milch cows do almost as well as on grass. I believe the saving is fully one-third; and taking into consideration the amount of damaged and coarse fodder that can be made available, I should put the saving at fully one-half, if I were not afraid that some one who has not tried it would be inclined to doubt my veracity or question my intelligence.

Now as to the cost of steaming. For a stock say of 50 head, one should have a good portable engine of not less than five-horsepower; six or eight horsepower would be better and cheaper in the end. The cost of engine, shafting, belting, steam and water pipes, steam-box, &c., fitted up in good order, will be from $1,000 to $1,500. This may seem like a large investment for so few animals, but I believe it will pay. For example, suppose it requires 75 acres of meadow to furnish the fodder for this number when uncooked. Now if two-thirds, or 50 acres, will do it when the food is cooked, there will be 25 acres saved by using the steam apparatus. Twenty-five acres of such land would be worth, in this section, not less than $5,000—more than three times what the steaming apparatus would cost at an outside price. The cost of harvesting 25 acres of hay will be as much as, or more than, the expense for fuel and labor to cut and cook the product of 50 acres.

When food is to be cooked in considerable quantities, great care should be taken to have everything as convenient as possible; for if it is not so, the cost of labor will equal all that is saved by cooking. The feed cutter should be in the position where it can be most readily fed; the cut hay, water, bran, meal, &c., should be mixed by power and fall into the steam-box by their own gravity, or be carried into it by elevators, and the steam-box should be in as close proximity as possible to the stock to be fed. I have taken considerable pains to consult, either personally or by letter, with a large number of farmers who have practiced cooking feed; and have never yet found one who had made use of suitable apparatus, that was not fully satisfied with the benefits of the system.

It is very important that the feed should be thoroughly cooked—cooked till it is soft to the touch. My steam-box, as above stated, holds 200 bushels or more. One man can cut this amount in less than an hour, and have it mixed with water, bran, meal, &c., ready for steaming. Just here the cost ends for labor. The fuel required will be about 50 pounds of coal, or its equivalent in wood. Now if there is any labor for the engine to do, such as sawing wood, grinding or threshing grain, it is ready for it, and the box of feed will be cooked for nothing; if not, 50 pounds more of coal will complete the cooking. The box of cooked feed can be distributed to the different animals with less labor than if the same amount of fodder were taken from the loft and distributed.

ROSES AND THEIR CULTURE.

ALL CULTIVATED FLOWERS are beautiful, whether classed under the general and separate heads of Bulbs, Annuals, Herbaceous Perennials, Tender Bedding Plants, or Ornamental Shrubs, and all are worthy of their full share of attention. But as we must take one thing at a time, we propose here to devote a little space to the ROSE—rather for the purpose of a general glance at some of the most desirable varieties for a small collection, than an attempt to give anything new to experienced cultivators. When the novice looks over catalogues containing many hundreds of sorts, he is sometimes tempted, in his bewilderment, to wish for the days of Pliny, who enumerated only twelve varieties cultivated in Italy. Alfred Smee says, in speaking of a single class of roses, (the Hybrid Perpetuals,) that the best plan for an amateur is "to commence with at least *two hundred* good kinds, and afterwards add single specimens as his fancy may dictate." In his garden Mr. Smee has roses in bloom nine months of the twelve, and in summer there are tens of thousands of flowers at the same time. A friend gave him a select list of one hundred and sixty sorts that he regarded as indispensable. Some American cultivators of more moderate wishes would, on seeing them all, cut the list down to twenty, by throwing out a hundred and forty which, after all, might be as good, on an average, as those retained. Ellwanger & Barry of Rochester, who stand among the most extensive cultivators of the Rose in America, have less than one hundred and fifty of this class in their general catalogue. If the amateur should buy all these, he would make a fair beginning, even with this moderate number, as our English florists would regard it.

The prevailing taste or fashion changes frequently, and the purchaser will find a very different list in the nursery catalogues of to-day compared with those of twenty years ago. Smee says : "The love of any particular florist's flower is subject to the caprice of fashion, and varies year by year. The pet of one period is the discarded one of another. The same rose to which the judges award a prize one day injures the exhibitor's chance another. But," he adds, "the wild flower satisfies the eye from century to century, and what delighted Horace and Virgil will continue to delight our grandchildren's grandchildren."

NOTES ON DIFFERENT VARIETIES.

There are some roses not now found in nursery catalogues that, nevertheless, have good qualities enough to entitle them to a place in rose gardens. Among these are the Scotch roses, (fig. 17,) remarkable for their hardiness, free growth and profuse blooming quite early in the season. The flowers are rather small, symmetrical in form, and of many different shades

of color. In the autumn the bushes are covered with ornamental seed pods. The advantage which Scotch roses possess of very free propagation by suckers, is also a disadvantage in their tendency to run wild, which is to be prevented by cutting away the suckers about mid-summer.

Fig. 17.—*Scotch Rose.*

Fig. 18.—*Persian Yellow.*

THE AUSTRIAN AND YELLOW ROSES, quite distinct or peculiar in their character, should enter into every full collection. They bloom quite early, and only once a year. The bushes are rather moderate growers, and in soils not properly adapted to them their growth is feeble and their propagation rather difficult. The Scarlet Austrian has orange-red petals inside and yellow outside, and in the sunshine the flowers make a most brilliant show. The Persian Yellow (fig. 18) is a finer double yellow than the Harrison but not so free a grower.

THE HYBRID CHINA ROSES are free growers and quite hardy, and are among the very finest June or summer blooming sorts. Some of the best are the following: Madame Plantier, pure white, blooms in fine clusters; Blairii, rosy crimson; George IV, dark crimson, very large; Triomphe d'Abbeville, rose purple; La Tourterelle, dove color; Chenedolle, brilliant light crimson; Madeline, pink, edged with crimson; Great Western, bright crimson.

Fig. 19.—*Moss Rose.*

MOSS ROSES, (fig. 19,) have always been greatly admired, and the flowers appear to best advantage as they are beginning to open. Among the white varieties are Comtesse de Murenais, large, double, blooming in clusters; White Bath, pure white, plant rather feeble; and Reine Blanche, large, white, plant vigorous. Among the finer rose and crim-

son sorts are Lanei, Raphael, Glory of Mosses, Baron de Wassenaer, Princess Alice and Marie de Blois. Princess Adelaide, although not so mossy as others, has the advantage of being the most vigorous of all this class.

All the preceding are June or summer blooming sorts. The Bourbons, Noisettes, Bengal and Tea roses, which bloom through the season, and especially in autumn, are more or less tender, which constitutes a serious objection to them with those who cultivate roses only in open gardens. The Noisettes are mostly the hardiest, some of them, like the Champney, which is a true Noisette, requiring little or no protection ; while others, as the Chromatella, which is a cross with the Tea rose, require a cover of leaves, straw or evergreens. The Bourbons may be mostly wintered in open ground by means of a moderate protection. The Bengal or China roses are better adapted to pot culture, although most of them may be kept out-of-doors if well protected. The Tea roses are too tender for this treatment, and require a house or pit. The following are some of the finest of these four classes :

BOURBON.—Blanche Lafitte, Decandolle, Emile Courtier, Catherine

Fig. 20.—*Souvenir de la Malmaison.*

Fig. 21.—*Fairy Rose.*

Guillot, George Peabody, Hermosa, Sir J. Paxton and Souvenir de la Malmaison, (fig. 20,) the last, one of the finest of all roses, blooming through the entire autumn.

NOISETTE.—Aimee Vibert, Champney, (for its hardiness,) Cloth of Gold, Celine Forestier, Solfaterre, Washington and Lamarque.

BENGAL OR CHINA.—Sanguinea, President d'Olbecque, Cytheri Daily and Lawrenceana, a very small or dwarf variety. Smee describes a minute plant, known as the Fairy rose, (fig. 21,) which in mild climates produces a beautiful effect as an edging around rose beds.

TEA.—The Gloire de Dijon is among the best (fig. 22) as a continual bloomer, and Marechal Niel (fig. 23) is generally regarded as standing at

the head of the list of all Tea roses, blooming with profuse luxuriance under glass.

Fig. 22.—*Gloire de Dijon.*

Fig. 23.—*Marechal Niel.*

As the varieties in the preceding four classes all need winter protection, and the brilliant June roses bloom but once in the season, we turn to another class of roses, which are both hardy and are autumn bloomers. These are the Hybrid Perpetuals, which at the present time are more popular than any others, and hold a larger space in nursery catalogues. Among so many fine sorts it is almost impossible to select a small list, but the following are certainly fine: Caroline de Sansal, John Hopper, (fig. 24,) Sydonie, La Reine, Maurice Bernardin, General Washington, Anne de Disbach, General Jaqueminot, Victor Verdier, Lord Raglan, Marie Baumann and Madame Barriot, (fig. 25.)

Fig. 24.—*John Hopper.*

Fig. 25.—*Madame Barriot.*

CLIMBING ROSES.—In addition to their own beauty, climbing roses impart ornament to the objects which they cover, and for this purpose they may be trained over walls, old trees, buildings, or in more finished forms as pillars. The Prairie Roses are most esteemed for this purpose, and possess great vigor of growth, perfect hardiness, and afford dense clusters

of flowers. Among the best sorts are the Queen of the Prairies, Baltimore Belle, Superba Triumphant, Perpetual Pink and Mrs. Hovey.

The Ayrshire roses are slenderer than the preceding, but grow with great rapidity, and although the flowers are not showy, the plants are well adapted to cover banks, walls, &c.

Fig. 26.—*Felicite Perpetuelle.*

The Purple Boursalt may be trained to cover any surface, and is perhaps the hardiest and most free growing of all roses, as it will flourish and bear sheets of crimson purple flowers with no care or culture.

Felicite Perpetuelle (fig. 26) bears masses of small, creamy white, compact flowers, but it requires a slight protection in winter.

The varieties named in all the preceding classes constitute a very small portion of the vast multitude of sorts now in cultivation, and if these few were stricken out of existence, there would be enough left to make half a dozen similar selections, which most observers would pronounce equal to the first.

Management and Culture of Roses.

The first thing is to secure a proper soil. The rose requires high culture. An old writer says, "from nothing, nothing springs." This applies especially to roses, for fine flowers cannot be produced without abundant food, in the shape of manure. One-fourth of the whole bulk of the soil is not too much. A strong, mellow loam is best; a dry and poor gravel or sand is worst. The latter, to be successful, must be copiously treated with compost, clayey loam and rotten sods, well worked in. A wet soil will require thorough drainage. Roses will never succeed well in the shade, or within reach of the roots of large trees.

Planting.—The plants may be set out either in autumn or in spring. If in autumn, they will need some protection, which may be given by banking the soil up about the stems half a foot; if the tops above this earth are winter-killed, no harm will be done, as they should be pruned within six inches of the surface. Additional protection, if needed, may be provided in the shape of dry leaves or small evergreen boughs. If the plants have been slightly loosened by the winter freezing, tread the earth in spring compactly about them, and then loosen it between the rows with a fork.

Pruning.—If roses are set in autumn, omit pruning until the following spring, as mutilation has a tendency to make all plants tenderer. If set out in spring, they should be cut down at least one-half, to impart vigor of growth. Old, enfeebled wood, or soft and defective young shoots, should be always cut away. The pruning should be done early in spring, or before the buds

swell; if performed after growth has begun, it will check and enfeeble the plant. After the bushes have become established, severe pruning will give larger and finer roses, and fewer of them; with moderate pruning the flowers will be more numerous, and smaller. But it must not be forgotten that a deep, rich soil, kept constantly mellow, must accompany pruning if flowers of great size and surpassing beauty are desired.

PILLAR AND PYRAMID ROSES.—Wooden structures in the form of pyramids are frequently made for running or climbing roses, but they soon decay, and sometimes blow over, presenting a rather sorry appearance. If pyramids are used, they should be made of iron rods, which will last long, and they keep their places. But a better and easier mode of training is in the form of pillars, a single tall post of durable wood being

Fig. 27.—*Pillar Roses.*

Fig. 28.—*Pyramid Rose.*

set firmly in the ground, and the running stems secured by boring horizontal holes and passing the young shoots through them, or by inserting short rods in the holes for the stems to rest upon. Or the stem of a cedar tree may be taken and the branches cut off so as to leave short supporting stems. When the climbers have fairly covered them, these pillars appear as shown in fig. 27.

Smee forms self-supporting pyramids of strong growing roses themselves in rich soil, from four to six feet high, and three or four feet across, as represented in the accompanying figure, (fig. 28.) Standard roses, made by budding on tall stems, although succeeding in England, entirely fail in the climate of this country. They are not universally admired even where they succeed best. An English horticultural writer gives his opinion in these words: "The common fashion of making a rose tree, appears like a mop with the handle stuck into the ground. This stick is rarely strong enough to sustain the weight of the head, but requires an iron staff, so that the mop-head appears to come out of two sticks. At the top of this head branches of flowers arise. I have succeeded in looking on this unnatural mode of cultivation as a horticultural mistake." From moderate growers the best flowers are obtained, and especially of the Hybrid Perpetuals, by keeping the plants in the shape of bushes of moderate height, pruned as far as may be into handsome rounded form, (fig. 29,) so that new and vigorous shoots may be renewed by pruning away the old wood early in spring.

Fig. 29.—*Rounded Bush Rose.*

Perfect Roses.—Peter Henderson, (in the Agriculturist,) in allusion to the fact that all the good qualities of fragrance, beauty, hardiness and constant blooming are not to be found in one rose, quotes the words of a German neighbor, who came to him in great irritation and said, "I have so much drouble wid de ladies when dey comes to buy mine rose; dey wants him hardy, dey wants him doubles, dey wants him mondly, dey wants him fragrand, dey wants him nice gouler, dey wants him eberydings in one rose. I have somedimes say to dat ladies: Madam, I never often sees dat ladies dat was beautiful, dat was rich, dat was good tember, dat was youngs, dat was clever, dat was berfection in one ladies. I sees her much not!"

Roses in Ancient Times.—Whole shiploads of roses were brought to the city of Rome, in which there were shops where nothing else but roses was sold. The artistic garlands made there of roses woven together were held in such honor that the name of Glycera of Nicyon, a famous artist in that line, has come down to us, and would compete with the name of Constantine. Whatever the time of year, the Roman must then have a rose in his wreath. The most common bouquet was made of violets, myrtle and roses.

DESIGNS FOR BARNS.

Design I—Barn for Cattle.

IN EXAMINING the accompanying design—intended to accommodate about twenty head of cattle, with all the conveniences suitable for a first-class barn—it must be borne in mind that there will always be considerable variations, according to local circumstances, the surface of the ground, and the wants of the owner. We could give half a dozen plans, all quite different from each other, and each adapted to some peculiarities of position; but the one now described is one of the most convenient, when the ground, is in proper shape for it. It is supposed to be placed between two slight knolls or elevations, or to extend across a small depression in the surface of the ground, so as to be easily entered at each end, and admit the free passage of wagons in at one door and out at the other, without the trouble of backing out, as in most barns. Or it may be built on nearly level ground, plowing, scraping and lowering the place for the basement only a few inches, or not over a foot, and placing the earth thus excavated at each end for the entrance roadway to the floor.

Every barn should have a basement, not only for the cheapness of the space thus obtained, but for the security and preservation of the timbers, and we shall take it for granted that every good plan makes provision for such a basement. We begin therefore at the bottom. The barn is supposed to be 48 feet wide and 72 feet long, and will be spacious enough for a good hundred-acre farm, under fair cultivation. The size may be varied, and the plan is of such a character that any desired length may be given to it.

The plan of the basement (fig. 31) nearly explains itself. A cart-way a little lower than the stalls, and 12 feet wide, runs across through the centre, chiefly for the purpose of carrying off the manure as fast as it accumulates. There will be no difficulty in making this through passage, provided the ground is nearly equally level on both sides of the building. But it will not be practicable if it stands on a slope or hillside, in which case the cart must be backed in through the double door for drawing out the fresh droppings or manure.

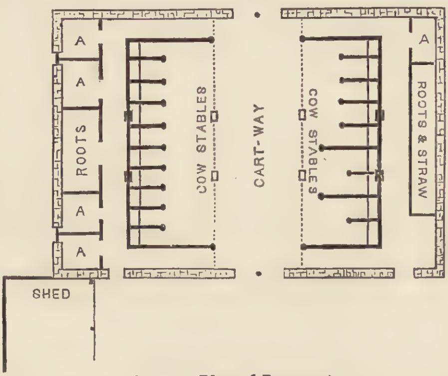


Fig. 31.—*Plan of Basement.*

More space is given to the cattle-stalls than is usual, both for the health and cleanliness of the animals and for the convenience of the attendant. By taking off a space or passage-way next the wall three feet wide, 40 feet will remain for the stalls, allowing each one to be four feet wide, except that on the right side there are four stalls that are each five feet wide, to admit larger or fattening animals, or to be used as horse stalls occasionally, if circumstances should require. The free passage which extends all around both lines of stalls contributes greatly to the health of the cattle, by allowing a freer circulation of air, and preventing contact with the damp walls of stone. The small apartments, A A A A A, which may be 8 by 10 feet, are intended as calf-pens or for cows expected to have calves. The root bins at each end are protected from freezing in winter by two or three feet of loose straw thrown down upon them from above.

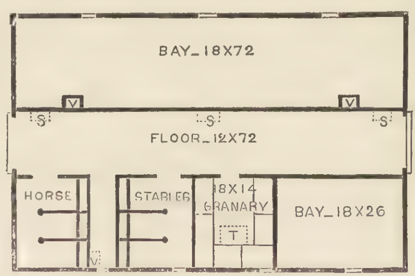


Fig. 32.—*Plan of Main Floor.*

The fodder for the cattle is passed down from the bay through the ventilators or shoots, V V, fig. 32, into the passage in front of the mangers; and the straw for covering the roots and littering the stalls is thrown down through the side trap-doors, S S S, from the threshing floor.

The horse stalls are placed above, as being dryer and more healthy—although by the usual close and compact way of constructing cattle stalls, enough room would probably be left for both below; but we prefer more space and better health. The stalls for the horses on the upper floor may be 5 or 5½ feet wide, leaving one in each apartment next the doors 7 or 8 feet wide, so that a pair of horses in harness may be driven in and fed side by side, in the middle of the day, or at any hurrying time, without stopping to unharness or separate them. The dotted lines in the passage between the horse-stables show the place of the ventilator overhead. The hay may be thrown from above through this ventilator, or it may be fed to them from the barn floor.

The granary will hold several hundred bushels of grain aud meal. A wagon may be readily loaded from this granary by passing the filled bags down through the trap-door T, to the wagon below in the passage already described; and a tube and slide may enable the attendant to draw oats or meal for the animals below.

If desired, the space of the smaller bay, at the right of the granary, may be occupied as a tool-room, workshop, &c.

The perspective view of the barn (at the head of this article) is intended to represent a handsome exterior, suitable for a farmer who has some regard to the ornamental appearance of his estate—the additional cost being more than compensated for, by the protection afforded from the weather by the broad projecting eaves, and by the thorough oiling and painting of the outside. The posts should be not less than 20 feet, as horse-forks will throw up the hay, &c., with ease to the top of the bays. The space contained in the large bay will be over 30,000 cubic feet; in the bay opposite, and over the nine feet space of stables, will be over 20,000; while space equal to 6,000 may be occupied on platforms over the floor. In all, 56,000 cubic feet, or enough to stow away about 100 tons of hay, or 50 tons of hay and an equal amount of unthreshed grain.

Some of the Details.—There are several details connected with the construction of this barn that should not be overlooked.

Slate for the roof is the best and cheapest material that can be used on a barn, when its durability is taken into account; and the rainwater will be cleaner and purer than from any wood roof. But if shingles are used, the whole should be well coated with crude petroleum. Two barrels of petroleum, costing about twenty-five dollars, would cover the whole roof of this barn, and a man with a whitewash brush would apply it in three days, making the whole cost only thirty dollars, and it would be worth at least three hundred dollars.

The whole surface of the roof, including the eaves-projections, would be over 4,000 square feet, and more than 2,500 barrels of water would fall annually upon it, affording seven or eight barrels daily for watering cattle, if supplied from this source all the year round. If, therefore, there is no water from springs or wells, the cisterns should hold 700 or 800 barrels, so

as to afford a supply for three or four months of dry weather, should it occur. If there are other sources of water, this size would not be necessary.

The shoots or ventilators used for throwing down hay from above, should be planed smooth inside, and be slightly larger below, so that the hay will have a free passage down, and not lodge in them. The position of the ventilators not being exactly under the peak of the roof, and the one from the horse stables being quite at one side of the barn, they are carried up to the top of the roof, close under it, in the direction of the rafters, as shown in fig. 33.

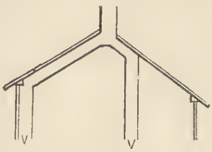


Fig. 33.

The trap-doors for throwing down straw from the barn floor, are not flat on the floor, but open through the board siding which surrounds the floor, the doors dropping flat when opened, and being buttoned up again when not in use.

The ventilators at the top of the roof, near each end of the building, are shown by figs. 34 and 35—the first being a perspective view, and the second a section. They are made of 2-inch plank, the top being held to its place by iron rods firmly screwed on. These ventilator tops cost but a few dollars each, and if made in the form represented, *will always cause an upward current through the tubes when there is any wind or breeze.*

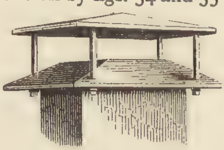


Fig. 34.

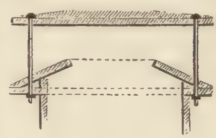


Fig. 35.

A tube or discharger may pass from the granary to the stables below, for the conveyance of oats or feed, and always furnish a ready supply, if made in the form shown by fig. 36. The grain may be scooped up with a dipper from the horizontal open box, which may commonly be covered with a lid at the dotted line, and locked, if desired, when not in use.

Fig. 36.

All the bins in the granary should be graduated up the inside, so as to show by figures how many bushels they contain at any height. This can be done by measuring the size and calculating the contents, allowing 2,150 cubic inches to an even bushel.

The cost of this barn will vary greatly in different localities, with cost of materials and perfection of finish; but in the Eastern States, well made of good materials, solid plank floors, battened and painted sides, and slate roof, it would cost about $4,000, although many skillful builders would erect it for $3,000. Of rougher and cheaper materials, it might be built at a much lower price.

Design II—A Sheep Barn.

The accompanying figures show the construction of a sheep barn on the farm of Hon. George Geddes, near Syracuse. N. Y. Its chief merit, beside that of convenience, is simplicity. The upper part, which holds the hay, has no divisions or hay shoots, and is filled by the use of the horse-fork, with great ease and rapidity. The barn, which was made many years ago, is 20 by 80 feet; with the improved facilities for filling, Mr. Geddes would prefer to have it 30 by 80 feet, and higher, for a greater amount of fodder; and the basement, where the sheep are fed, being larger, would hold a greater number.

On the approach of winter, when foddering the sheep and enclosing them under shelter are commenced, a man enters the hay loft at one of the upper doors, and with a hay knife commences cutting an opening through the hay downwards, opposite these windows, until he reaches the level of the floor on which the hay rests, throwing the hay on either side or outside, with a fork. This opening is three or four feet wide, and extends across the bay. It is commenced at one side like a well, and afterwards the hay from the rest of the opening thrown down through it. Immediately under this opening there is a space in the floor, for throwing down the hay to the sheep; it falls at once into the double feeding racks below, which extend across the basement under the opening.

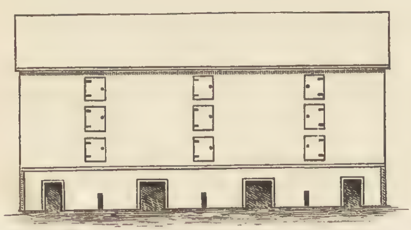


Fig. 38.—*Elevation.*

The basement is divided into four parts or pens, which are entered by the sheep through the wide doors shown in the elevation, fig. 38. The

two middle appartments have feeding racks on both sides—the end ones only on one side. Fig. 39 shows these apartments. The bars of the racks are two inches apart, and about two feet long, and diverge slightly upwards. A small trough, a few inches wide, projects from the bottom of the racks, for feeding grain or meal. Fig. 40 is a section of the racks.

The fodder with which the sheep are fed is well cured clover, which keeps them in excellent condition, and their manure is of the richest kind.

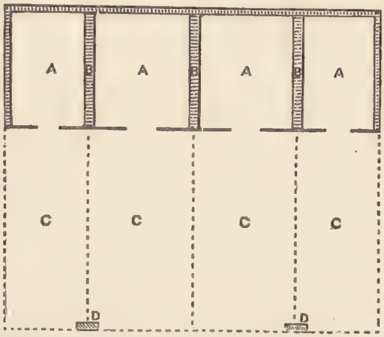


Fig. 39.—*Basement and Yards*—A A A A, *apartments in basement*—B B B B, *double feeding racks*—C C C C, *yards*—D D, *water troughs.*

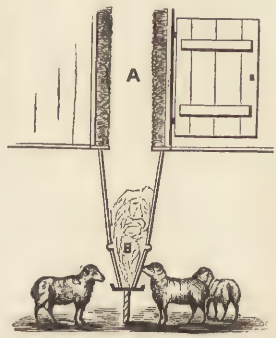


Fig. 40.—*Cross-section of feeding racks, and of cut in bay above*—A, *cut or opening made in hay*—B, *double racks between apartments.*

Outside the basement a yard is attached to each of the apartments of the basement, for the run of the animals, and water is supplied from a spring, brought through pipes. Altogether these animals had, at the time visited, (depth of winter,) a very plump, comfortable appearance, and looked as if they appreciated, at least in some degree, the many provisions made for their enjoyment.

It will be observed that a few minutes are sufficient to feed with hay all the sheep in the four pens, by throwing it from the bay above immediately into the racks where it is wanted. The openings cut into the settled hay for this purpose, as already described, are more easily made, and with smoother faces, after it has become compact towards winter, and when hired men are not hurried as in haying time; and the open swoop of the whole loft for the free play of the hose-fork, more than overbalances the advantages of box shoots for carrying down the fodder.

Design III—Barn for General Purposes.

This building was designed at the request of a Missouri farmer and Short-Horn breeder, who wished to erect—on ground sloping to the west, one foot in twenty—a barn to contain the following: Thirty head of cattle, 8 horses, 600 bushels of grain, 1,000 bushels of ears of corn, 60 tons of hay; room for shelling, cutting and grinding; for tools, small tools and work-

Fig. 41.—*Barn for General Purposes.*

bench; for horse-power, &c., and for a quantity of unthreshed grain equal to one-half the bulk of the hay, as the granary indicates it.

Fig. 42 represents the main floor, the barn being 38 by 68 feet outside. The floor in the middle is 20 feet wide; the bay for hay, on the right, 28 feet wide; leaving 20 feet on the left for granary and stables. The tool-room, 12 by 28 feet, affords ample space for workshop and all the smaller tools. The floor is large enough for the tread-power (which is more convenient and better than a lever-power in this case) and for wagons not in use. It is more convenient to run them out from such a floor, than if packed closely in a special house for the purpose. There is also plenty of room on the floor for shelling corn, cutting straw, &c. Most of this work can be done towards the rear of the floor, as there are two good windows, one on each side of the rear door, to let in an abundance of light.

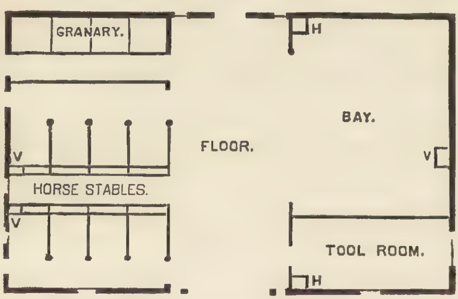


Fig. 42.—*Main Floor.*

As horses often suffer when kept in a damp basement, these stables are placed above. They are entered from the barn floor, through the front side door, and are supplied with hay from the same floor, thrown down from above. If desired, hay for the horses may be stored over the stables, and hay tubes extended down from this to the horses; four such tubes would

be required for the eight stalls. We should prefer omitting them, as they are in the way of filling the bay with hay. The stables and granary may be nine feet high; and the space over them being 20 by 38 feet, and extending upwards about 16 feet more as an average, this bay would hold about 24 tons of hay, or an equal amount of unthreshed grain. The large bay on the right, 28 by 38 feet, and extending upwards about 25 feet in all, will hold 50 tons of hay. Floors over the main floor will hold ten or twelve tons more.

Horse stables should be placed in the basement only when the earth on which the barn stands is dry and gravelly, and partitions are made between the walls and the stables. When practicable, it is safer to put them above, as in this plan.

The granary is situated at the corner, and an outer door opens from it, so that a wagon below may be readily loaded from it with filled bags.

Ventilators are shown at V V V, and hay tubes at H H, through which hay is thrown down to the feeding alley in the basement. It will be observed that these ventilators and shoots, being placed against the walls, are not in the way of storing the hay in the bay.

Fig. 43 is a plan of the basement, which contains room for 30 cows. The double stalls are seven feet wide, with a stout post in each, to separate the two cows. At the end of each line of stalls is a box or pen for cows with calf. Each line of stalls is about ten feet wide, the feeding passages four feet wide, and the manure passage ten feet wide. The cleanings are thrown into this passage, and a wagon or cart driven through to carry off the manure—either to the compost heap, or, what is attended with least labor, directly to the field, and spread at once. The dotted lines at H H show the places where the hay is thrown down through the hay tubes from above, and V V V are the places of the ventilators. The mode of constructing the tops of these ventilators, above the roof, is described on page 154.

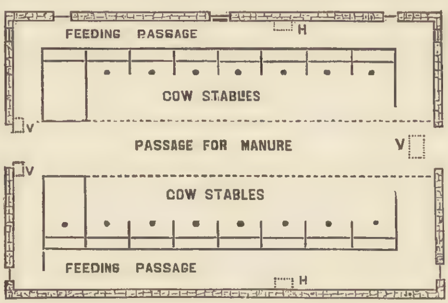


Fig. 43.—*Basement of Barn.*

We have found it very convenient to place a crib or granary for corn in ear in one corner of the barn, over the basement, by making the floor of slats, and open to the free circulation of the air or draught of wind, which blows up freely among the ears and keeps them dry, if not piled up more than five or six feet thick. The small quantity of shelled grain which drops through the slats is picked up by hens below. We have not shown this

crib in the plan given, because rats are commonly so abundant that they would destroy much of the grain, which was prevented in the case we have mentioned by a free range of cats. It will therefore be best generally to construct a separate corn-house, like that shown in fig. 44, from which rats are excluded by placing the building on short, round and heavy durable posts, cased with tin, and with an inverted tin pan on the top of each, with the wire rim cut off. A passage runs through the building, with the cribs on each side, these cribs being filled from above.

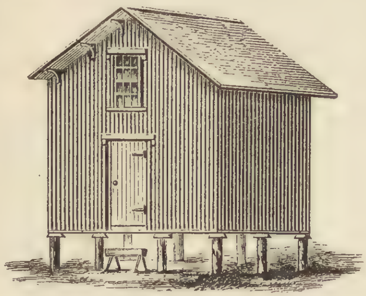


Fig. 44.—*Corn-House.*

There are a few details in erecting this barn, which we may mention briefly. By extending the barn floor without any obstruction under the large bay, by using trussed beams, wagons may be run there when the barn is empty, and in filling this bay, the first loads may be driven from the barn floor to the bay, and the load pitched off—a little backing of the wagon being required before driving out.

The basement walls should be about nine feet high, and at least two feet thick—2½ feet would be better. The bank thrown up to make a road-way to drive in, should never in any possible case rest against the wall, or it will ultimately throw it over. There should be either a dry wall outside for the earth to rest against; or a vertical stratum of gravel or broken stone, two or three feet thick; or a separate wall with a space between, bridged with plank. We should prefer the broken stone. The walls should go below frost, and rest on a trench of broken stone for drainage.

The posts should be 20 feet high, as hay is easily thrown up by the horse-fork to any height. The horse-fork and hay-carrier, working together, readily fill the large bay, which is 28 feet wide.

The view represents the siding placed vertically and battened. In common cases, a good plank floor is most easily kept clean.

Many useful details in regard to stable arrangements will be found in vol. 2, RURAL AFFAIRS, pp. 284 and 285, and in vol. 3, p. 143.

DESIGN IV—BARN FOR SHORT-HORNS.*

My plan of a barn is somewhat of the English style—but perhaps none the worse for that—and I have seen none in this country to surpass it. The diagram, fig. 46, is of suitable size for the accommodation of forty animals, 40 feet wide and 100 feet long, exclusive of a one-story lean-to for corn cribs (X Y) 15 feet square. In the main building adjoining the cribs

* Written for the COUNTRY GENTLEMAN by RICHARD KAY.

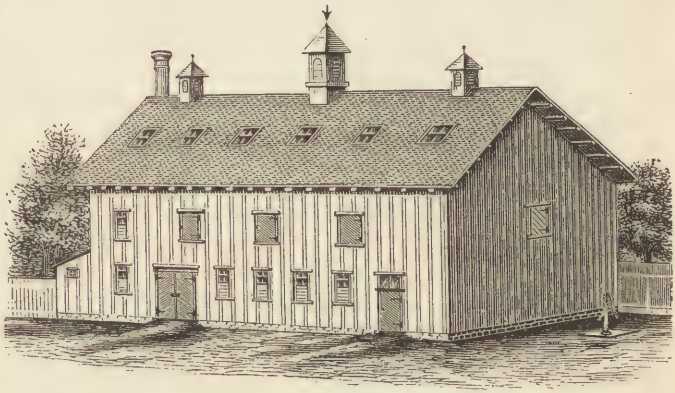


Fig. 45.—*Barn for Short-Horns.*

are two rooms—F for small grains, E for a steaming room—each 15 feet square, and a room for pump—and boiler, if one is used,—15 by 10 feet, C. Then comes a wagon-way through the barn, 10 feet wide. Next come the stalls for cattle, of which there are eighteen, each 10 feet wide and 8½ feet long; then a six-foot alley, which uses up the length of the barn, with the exception of nine feet, which is divided into a stall (T) 10 feet wide, for a bull, a smaller stall (U) for a young bull, a space (V) 10 feet wide for hay coming down from chamber above, and a box stall (W) 14 feet wide for

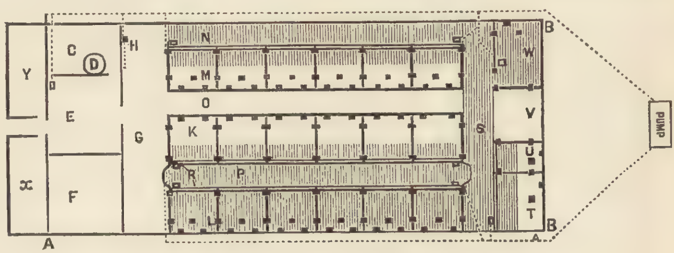


Fig. 46.—*Ground Plan.*

the cows to calve in. The alley behind the cattle pens (N) is 5½ feet wide; the alley O is 4½ feet wide; and the alley P, 5 feet wide. I lay a floor of brick running lengthwise the barn in all the alleys, and extend the same three feet up each stall, laying them lengthwise of the stall. The remaining part of the stall I fill with clay, or good soil well beaten down. I lay a curb, either of plank or stone, behind all the stalls, somewhat higher than the causeway, and depress the last three rows of bricks next the curb, so

as to form a channel behind where the cattle stand ; and towards this the floor of the stall has a sufficient pitch to carry into this channel all liquids. The centre of the pathway is also somewhat higher than the channel. These channels lead into drains, which connect with a tank outside the barn. I put a feed-box of cast metal on each side of the stall, and in the centre place a hay-rack in the shape of the letter V, the point or angle projecting into the stall, so as to be convenient for two animals, one on each side.

The stalls L are for suckling calves ; the stalls opposite (K) are for their dams, and the stalls M for other cattle. The stalls for calves are closed by gates opening in the middle, and swinging back to the stall posts on the other side of the alley, so as to throw both into one. When through with the calves, they can be driven to their proper places, the half gate closed, and there will be no further trouble with them ; the alley way is then left clear. Of course these stalls can be used for other purposes if desirable. In the front of the stalls for cattle there is a feed-box on each side, and hay-rack in the centre ; also a door hinged above the feed-box to admit feed from the alley. In fig. 47 is shown the construction of roof, for durability and the most room for hay.

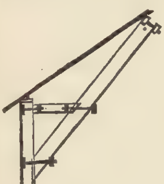


Fig. 47.

A great point in this barn is the economy in the bedding. The cattle lie on a dry, clean bed ; the calves are kept two together, easily suckled and returned to their places, making no trouble to turn out the cows, as the barn is perfectly clear. The channel throws off all urine into grates put in to receive it, and it is at once carried by drain pipes into a tank clear of the barn. The drain pipes should not be less than five inches. I prefer stench traps for grates ; they receive all sediment, and can be easily cleaned out twice a week. You thus have the liquid in the tank, which is often wasted in other barns, for putting on the manure pile, where its utility will soon be discovered. You also have the barn clear of all effluvia arising from decaying litter under the cattle—an important item in raising good stock.

You can make the barn of any length you require, every ten feet in length providing for six cattle. Any number of windows can be put in, on either side of the building. I prefer plenty of ventilation in hot weather, but like the windows closed up in cold weather, when the barn is well drained and free from any unpleasant smell.

You can put an engine in the pump room to shell and grind corn, cut hay, and pump water into a cistern put up to feed the engine and water the cattle. The hay cutter is put up in a chamber convenient for the hay, which, after being cut, comes down a spout into the room E below. This room can be used for steaming, by fixing a pipe from the boiler into a steaming tube. This system I prefer where good cattle are to be raised, as experience teaches me.

In the perspective view, the squares in the roof are plates of glass, put in the same as shingles or slates.

Hints on Feeding.—This is an all-important matter to look to. There are not many turnips or roots grown in the United States, or oilcake available for feed; therefore something must be sought as a substitute, and you must set up an engine to shell and grind corn, and cut hay. Mix the cut hay with the corn meal, and linseed or flax meal, and other feed stuffs, and steam all together, and you have a good feed that cattle will thrive on. Some people say Nature has prepared all feed for animals. That is a mistake. Man is set on the face of Nature, and must prepare and make the feed in a proper form for the animal to digest it, so that its blood and body may be kept in good order, or the animal would soon become ill-shaped and diseased. For instance, feeding on corn, in the ear or shelled, will soon prove this idea true. The blood becomes too much heated, and disease presents itself. How many cattle are troubled with foul, a disease in their feet, difficult to get rid of as long as they are allowed to stand in wet litter and are fed with dry corn! Why not grow more flax or linseed, and use it freely in steamed food? Then you might expect to see your cattle taking on flesh in good and perfect order.

Cleanliness is the point next in importance. The animal should lie on a clean, dry bed of straw, and by setting the animal up from the channel of the footpath you obtain this, the channel carrying off all liquid, which is drained into the tank, and is highly useful for enriching the pastures for summer feed and expelling some of those weeds which now overrun them.

There is one point I would here notice in the Short-Horn cows—that is, garget or spoiled bags, owing mainly to suckling their calves. They should be carefully followed, and all milk remaining after suckling be taken from them, and their bags rubbed dry; and should the animal be out of order, it should be attended to immediately, for bad results sometimes follow where a little attention in time would have set it right.

Good usage is of great importance in raising fine stock, and the countenance of the animal soon indicates whether good or bad treatment is practiced. I have known bad treatment used in the attempt to subdue an animal, but it always failed.

Design V—Another Short-Horn Barn.

The engraving on the next page, fig. 48, represents the east elevation of a large three-story cattle barn erected by Mr. Charles E. Coffin of Muirkirk, Md., from designs furnished by Col. George E. Waring of Newport, R. I. The idea, as Mr. Coffin states it, was to obtain "the greatest amount of room for the money. It is not to be a barn built for the purpose of seeing how much money could be put into a barn, but to be built as cheap as possible for the amount of stock and hay that the barn will hold."

The building stands on a side-hill inclining to the south. The large

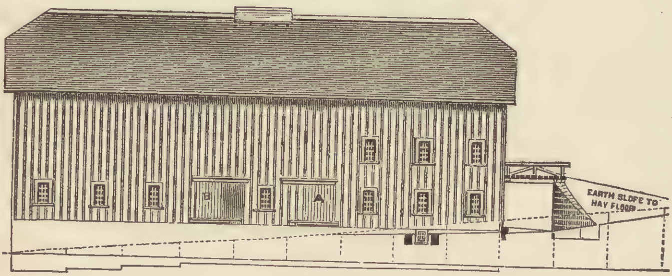


Fig. 48.—*Mr. Coffin's Barn.*

doors roll on rails supported overhead. The exterior surface of the barn consists of pine boards running vertically as shown, and battened. The roof is covered with hemlock boards and slate. The ventilator shown in the middle is divided into two parts; one communicates directly with the cellar, and the other with the hay floor.

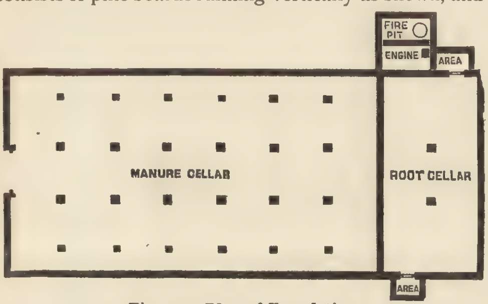


Fig. 49.—*Plan of Foundation.*

Fig. 49 shows the foundation. The dimensions of the main building are 100 by 44 feet; the apartments for manure and roots are 74 and 20 feet respectively in length, and the wing at the west for fire-pit and engine measures 10 by 12 feet inside.

Fig. 50 represents the first floor, which will accommodate 61 head of cattle, young and old. At the left of the boiler is seen a bridge communicating with an outer door. The stairs adjoining communicate with feed-room above.

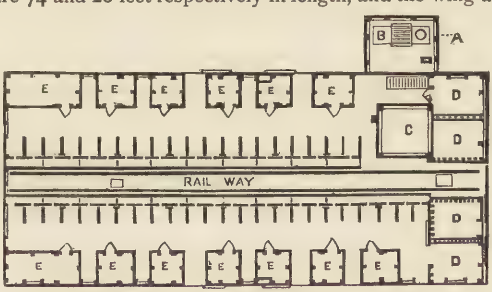


Fig. 50.—*Cattle Floor*—A, *boiler*—B, *boiler pit, the engine standing in the same apartment*—C, *steam-box*—D, *box-stalls*—E, *calf-pens.*

Scuttles opening into the two divisions of the cellar will be observed in the railway.

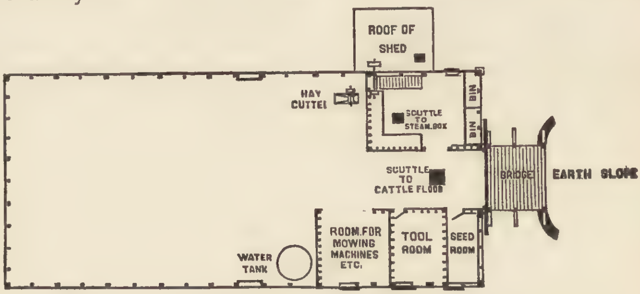


Fig. 51.—*Plan of Hay Floor.*

Fig. 51 is the hay-floor, next above, which stores about 150 tons of hay. The chimney is seen rising through the roof of the engine-shed, and the arrangement of shafting and pulleys for operating the hay-cutter will

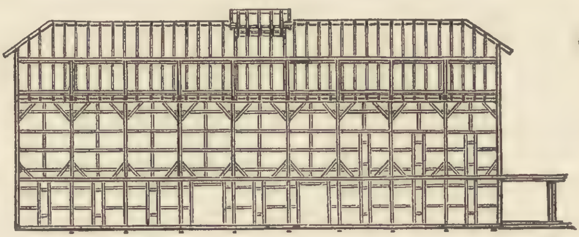


Fig. 52.—*East Elevation of Frame.*

be readily understood. The water-tank, holding nearly 8½ tons, supplies water at all times to the stalls below.

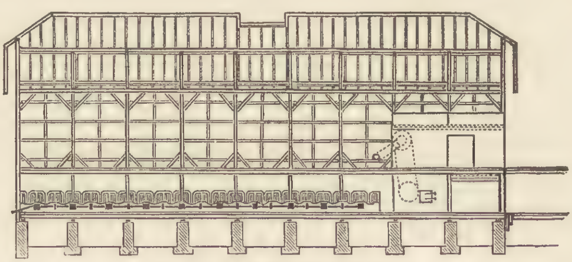


Fig. 53.—*Longitudinal Section.*

Figures 52, 53 and 54, representing the construction of the frame as seen from two directions, and a longitudinal section of the whole building, (which

illustrates the arrangement of cattle-stalls, water-troughs, belting from the engine, &c.,) give a pretty good idea of the skeleton of the structure. The first story is 8 feet 9 inches high; the second, nearly 16 feet, and the roof about the same. Cross-sills, 8 by 8 inches, are built into the foundation walls, and rest on piers. Outside sills, same size, rest on foundation and on top of cross-sills. Posts and girts 6 by 8, with braces 4 by 6, as shown. Floor joists 2 by 12, sixteen inches from centre—except under the water-tank, where they are 3 by 12, and twelve inches from centres. Plates, 6 by 6; tie-beams, 6 by 8; purlins, 6 by 6. Rafters 2 feet 6 inches from centres. The barn received three good coats of Averill chemical paint all over the outside; the inside is entirely unpainted.

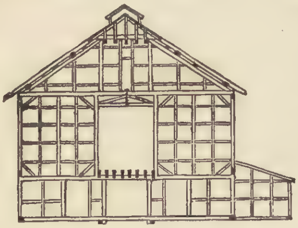


Fig. 54.—*North Elevation of Frame.*

Design VI—Barn for Medium Sized Farm.

A correspondent in Cecil county, Md., sent us, some time since, a partly finished design of a barn which he proposed to erect, requesting us to criticise it and endeavor to suggest improvements. From his sketch we have made the accompanying engravings—a perspective view being given above, plans of the two floors in figs. 57 and 58, and a partial section in fig. 56—these designs embodying several alterations and additions of details. As now arranged, we think the plan combines many advantages.

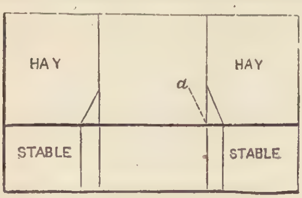


Fig. 56.

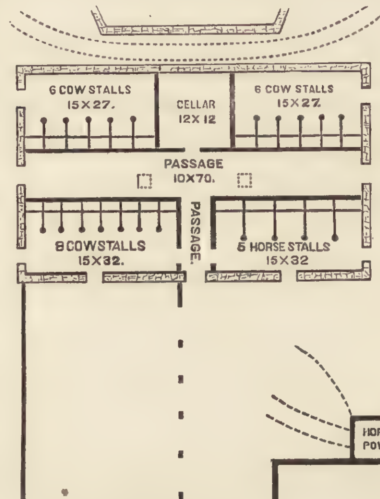


Fig. 57.—*Basement Stables.*

The basement has a stone wall, with an embankment for passing to the floor above, on one side only. A small window may be placed at the side of each basement door. The hay or fodder may be thrown down from above through side doors in the ventilators, (situated at the dotted lines,) or through doors opening at the sides of the barn floor, as shown at *a* in fig. 56.

In this plan the stables will be cleaned by wheeling out the manure by means of a wheelbarrow, which is better than throwing it out through the windows and making unsightly heaps against the walls. It may be wheeled away to any part of the yard into compost heaps.

The passage under the "bridge house" allows the ready filling of wagons with grain bags from the granary above.

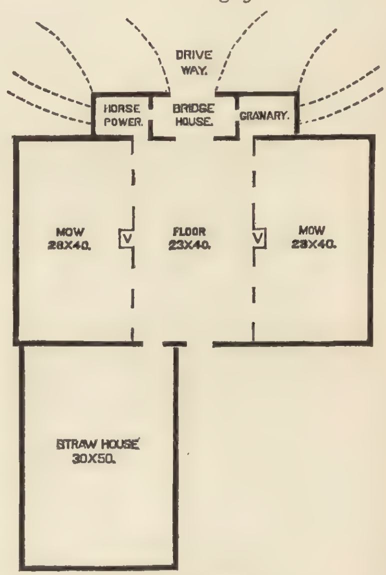


Fig. 58.—*Principal Floor.*

Design VII—Extensive Ornamental Barn.

The fine barn on the farm of B. W. Baum of Syracuse, N. Y., not only presents a handsome ornamental appearance, but has so many conveniences that we have procured a drawing of the plan, and a perspective view. As part of the buildings were erected before the present plan was adopted, they necessarily contain some imperfections, which might have been avoided

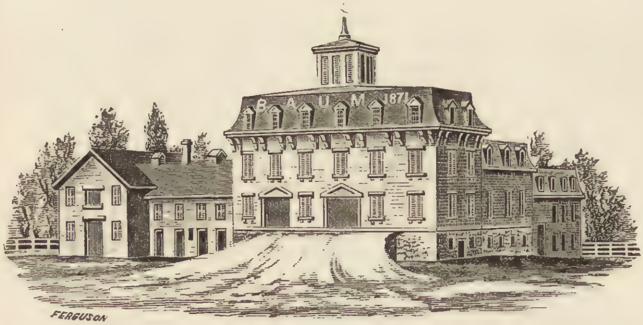


Fig. 59.—*Mr. Baum's Barn.*

if the whole had been built at once. Although the expense of these buildings (some $25,000) is much greater than farmers generally can incur, they will suggest many things that may be adopted in barns of smaller pretensions and cheaper character. It happens too frequently that no pains whatever are taken to give barn buildings an appearance that will render them an ornament to the farmer's grounds. Any attempt to remedy this common defect is therefore worthy of commendation ; and although few may be able to erect buildings with the handsomely painted exterior, the windows and blinds, slated French roof, and ornamental tower, seen in Mr. Baum's barn, yet an eye to a neat and symmetrical form, and enough of ornament to remove the baldness too often witnessed, will enable the owner to erect buildings with a positively pleasing appearance.

Much of the plan will make its own explanation. The two large entrance doors, seen in the view, and indicated in the plan, fig. 60, serve for the passage of teams loaded with hay or grain, which are driven in one door and out at the other. The teams may also be driven into the long bay at the right when this is empty, the partition being hung like gates, and opened when desired. The long bay is 38 feet high from the floor, and contains over 80,000 cubic feet of space. It will hold 160 tons of hay, or its equivalent of grain. It is filled by driving in the loads through the right-hand door, and the hay is removed from the wagons by means of the hay-sling made by W. G. Ricker of Rochester, N. Y., which obviates the use of the horse-fork, and enables the workmen to throw off a ton load in three minutes. Four slings are required for each load, and they are laid under each successive five hundred pounds of hay as the load is built in the field. A pulley, with two horses attached, lifts each successive five hundred, runs it off horizontally by means of the well known hay carrier, and drops it at any desired spot by the jerk of a cord.

Another large bay is situated over most of the floor, and over the tool-room and granary. The floor of this bay is reached by the stairs at the end

of the tool room, shown in the plan. This bay is 40 by 57 feet, and over 20 feet high; it contains over 48,000 cubic feet, and will store about 100 tons of hay or grain.

Between the stairs just mentioned and the tool-room, is a narrow closet for bags and other purposes.

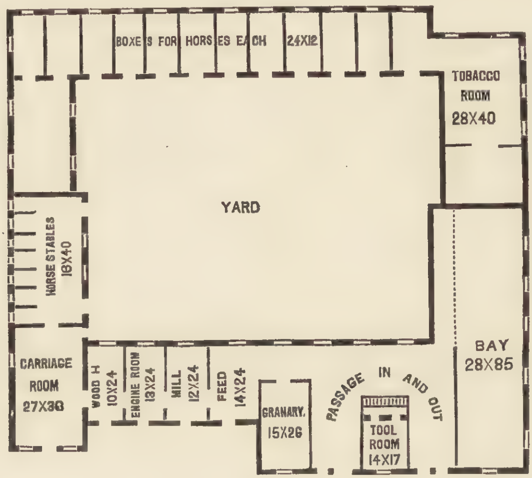


Fig. 60.—*Ground Plan of Mr. Baum's Farm Buildings.*

On the left of the portion already described is a building 24 by 60 feet, which contains the engine for cutting and grinding feed; the mill, steaming box, straw-cutter and corn-sheller—the latter overhead. The engine is about fourteen-horse power. The corn-sheller, made by Cook & Co. of Chicago, will shell 50 bushels or more per hour, or as fast as a man can shovel it into the hopper; it requires no regulating for corn with different sized ears, being self-regulating in this particular. The mill has common buhrstones 3 feet in diameter, and will grind 15 bushels an hour "right along," or by the continued day. Cars run from the bay to the cutting-box (which is overhead) for the conveyance of the hay or straw to be cut.

The carriage house and the horse barn extend from the left side toward the rear. The long rear building is occupied below with large loose boxes for fancy and carriage horses, kept at certain times of the year for the citizens of Syracuse. Over these the loft is to be devoted to the drying of tobacco. But few farmers will wish to erect buildings for this purpose, and the loft might be devoted to the storage of grain or hay. A three-hundred-acre farm, which has one hundred acres of grain and one hundred acres of good meadow, would need all the space afforded by this long loft in addition to

the bays before described, for the two hundred tons or more of hay, and the same amount of grain in straw, which would be yielded from good land.

We also give a plan, fig. 61, on a slightly larger scale than the other, of that portion of the basement, 40 by 85 feet, devoted to the cow stables. The front portion, which secures the animals by stanchions, holds 44 cows. The walls of the basement are of solid masonry 2 feet thick. Around the whole is a passage, *e e e e*, 3 feet 3 inches wide, with substantial wood floor. This floor extends over the whole stable, except the manure gutters, *d d d d*, which are 3 feet 4 inches wide, are a foot below the floor, and are made of water lime cement, deepest along the middle, like the roof of a house inverted, and descending about 4 inches toward the middle passage, where a pipe carries off the liquid to an outdoor underground tank. The floor, *c c c c*, is 4 feet 7 inches wide, and on this the cattle stand, their heads being secured by stanchions. The line on the opposite side of the line of stanchions represents the manger, which is 2½ feet wide and 22 inches deep. A chain is hooked across the passages when the cows go in and out, so that they may enter and depart through the cross passage without straying. The ceiling of this stable is 8 feet high. At *n n* are niches in the wall, which give us small open closets—the first for pails, stools, &c., and the second with shelves for various other purposes. The rear portion, 38 by 44 feet, is devoted to boxes for cows with calf, &c.

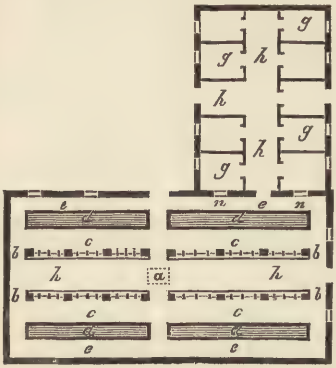


Fig. 61.—*Plan of the Cow Stables*—a, *ventilator over dotted square, down which fodder straw is thrown*—b b, b b, *lines of stanchions for forty-four cows*—c c c, *platform on which cows stand*—d d d d, *gutters for manure*—e e e e, *walk around the whole*—g g g g, *boxes for cattle, each* 9 *by* 12—h h h, *passage.*

The stanchions are substantially made, in a form similar to those we have formerly represented in Rural Affairs. The sill, which holds the bottom of the vertical pieces, is 5 by 6 inches, and stands on edge or on the narrowest side. The upper piece is 4 by 5 inches, and lies on its flat or broadest side. Mortises admit the vertical plank and the wooden latches. The vertical pieces are soft maple, an inch and three-fourths thick. The space for the necks of the cows, when closed, is 7 inches. This space was first made 8 inches, but found too large. All the stanchion frames are secured to the posts with screw bolts, so as to be readily removable.

Under the rear cow stable are root and manure cellars. Their sides and bottom are cemented with water lime; and to make this safe against frost, it is essential to use the very best cement and sharp, clean sand.

OUT-DOOR FLORAL DECORATIONS.

MUCH ATTENTION has been given of late years to the arrangement of colors in flower beds, so as to present several shades in separate masses. These have been termed *ribbon beds.* When the form is circular or elliptical, the massed colors are arranged in the form of zones, and may be made to produce an effect far more pleasing than by the promiscuous intermixture of different plants.

Ribbon beds are appropriate to the more finished and formal parts of ornamental grounds, and the lawn should be kept correspondingly in the neatest condition. The plants selected for these beds should be densely blooming sorts, such as Drummond phlox, verbenas, petunias, asters, dwarf marigolds, the smaller lobelias, pinks, candytuft, alyssum, stocks, portulaca, and the smaller species of silene. In the shade, pansies, daisies, nemophila, &c., will succeed well. Handsome ribbon beds may be made with bulbs, but as the flowers soon disappear, they should constitute a small portion of the beds in the grounds, or else the flowers should be followed by free-growing annuals. It is well worth while, however, to have a few beds of the earliest bloomers, before the leaves of trees and shrubs open in spring, even if the beds are to remain unoccupied through a large portion of the year. Nothing can exceed the brilliant and pleasing effect produced by a circular bed several feet in diameter, bordered next to the green turf with a band six inches wide of the blue Siberian squill, with another band within this of the white flowers of the snowdrop; then an equally dense zone of the wild hepatica, of a pink shade; and within these the various shades of the crocus. The central portion may be planted with the earliest varieties of the hyacinth. When these are done blooming, their places may be taken by the low, free-blooming, delicate annuals.

Bedding plants are peculiarly fitted to these beds, and combined with the long-blooming annuals, may be made to afford a brilliant display from midsummer till autumnal frosts. When, in addition to flowers, "foliage plants" are employed, the effect is still more striking.

There is scarcely any end to the various combinations of color, both in flowers and foliage, which may be made with the many plants suitable for the purpose. Fig. 62 represents a bed of tender bedding plants on the grounds of Ellwanger & Barry, elliptical in form, about ten feet wide and eighteen feet long. The outer belt is composed of plants of the *Alternanthera magnifica*, the foliage of which is dark purple; within this is a band of gold, made by a circle of the new golden-bronzed geranium, known as the "Pride of Mount Hope;" next is a belt of the fringed and hoary-leaved *Centaurea gymnocarpa*; within this, one of *Centaurea acanthæfolia;* and lastly, the centre is filled with the taller species of Coleus and Canna.

More recently the same skillful horticulturists have made great improvements in the arrangement of the plants, and one of the finest beds we have

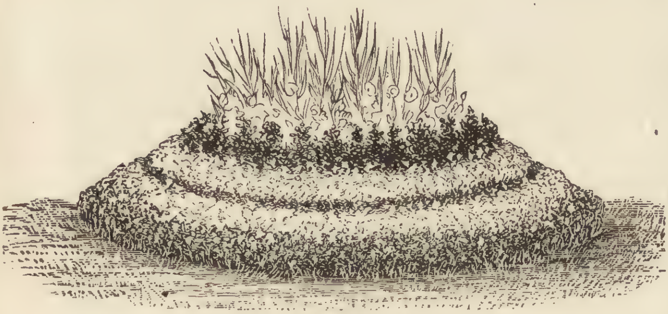


Fig. 62.—*Elliptical Ribbon Bed.*

seen was composed of the following plants, beginning at the centre and going outward: *Amaranthus salicifolius*, (weeping,) *Coleus verschaffeltii*, *C. aureum marginata*, *Centaurea gymnocarpa*, *Iresine linderni*, *Centaurea candidissima*. and a belt made of alternations of *Alternanthera* and varie-

Fig. 63.

gated sweet alyssum, and finally another belt of *Alternanthera* and *Teucrium polium*. This bed, in an elliptical form, and 20 feet in length, made slightly convex, on a smoothly shaven lawn, presented a gay and magnificent appearance, most of its effect being due to the contrasted shades of the foliage.

Fig. 64.

In order that ribbon beds may have their peculiarity well developed, not only should densely growing and free blooming plants

be chosen, but these plants should be kept pinched back during growth so as to increase the dwarf habit, and present an even surface at the top. Fig. 63 represents a ribbon bed thus managed, to a moderate degree; and fig. 64 represents one which is composed of two outer belts of low plants, pinched down so as to present the appearance of a carpet. But to avoid the almost bald appearance which the bed would present if the whole surface were thus treated, the central part is planted with some tall, dense, graceful-shaped ornamentals, such as the Salvia, as represented in the figure.

Fig. 65.—*Bed of Mixed Ornamentals.*

The formality of ribbon beds is an objection with those persons who admire the luxuriant freedom of nature, and such would prefer a bed planted with mixed ornamentals, and growing without restraint, as in fig. 65.

This objection may also be obviated by selecting compactly growing plants, and arranging them so that the masses may present pleasing contrasts. The following figures represent a plan and view of a bed on our own grounds, the arrangement of which was furnished us by Ellwanger & Barry. In the plan, fig. 66, the central portion is represented as occupied by twenty plants of the Gen. Grant geranium, which is well known as one of the finest bloomers, as well as for its brilliant scarlet flowers; next we have fifteen plants of *Centaurea gymnocarpa*, alternated with fifteen plants of *Iresine linderni*. The

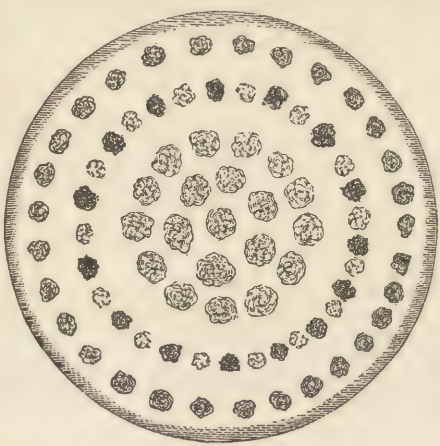


Fig. 66.

outer circle is composed of thirty plants of *Alternanthera*. The beautiful and rich blending and contrast of the scarlet centre, and of the dark and hoary leaves of the *Iresine* and *Centaurea*, present an exceedingly pleasing

Fig. 67.

effect when seen across the green lawn. To appear well, the plants should be arranged with mathematical accuracy, by drawing the circles with a cord and measuring the spaces. Fig. 67 is a slight representation of the appearance of the bed.

Other Ornaments of the Lawn.

Vases are usually placed in the more regular and formal parts of the grounds, but they may be filled with loose growing and trailing plants, and form a connection intermediate between the formal and the wildly picturesque. Fig. 68 is drawn from a cast-iron vase, painted white, standing on the grounds of Ellwanger & Barry of Rochester, the fine and graceful expression of which fits it for proximity to the wilder portions of the surroundings of the dwelling. This vase, with pedestal, is six feet high, and the whole height, with the plants, is nearly eight feet.

Fig. 68.

A late writer, speaking of the bad taste displayed by puny attempts in the introduction of vases, says: "I allude, of course, to those little nondescript articles that are a burlesque on the name and an outrage on good taste. In many of our country towns I have seen almost every enclosure disgraced with these wash-basins perched up on posts, with often a sickly-looking plant leaning over the edge, as if ashamed to be seen in such questionable company. Now I do not wish to be understood as deprecating altogether this class of adornments, but in the name of good taste do let us exercise some discretion in the matter. Where the grounds

are of sufficient size, a handsome vase of fair proportion, mounted on an appropriate pedestal, is always a pleasing object, especially when filled with healthy, suitable plants; and I have seen rustic vases formed of twigs and branches, with the base surmounted by ivy, when the idea of fitness to the place was unquestioned. The handsomest vase I ever saw was of medium size, with a vigorous specimen of *Russelia juncea* in the centre, and trailing over the edge was *Gnaphalium lanatum* intermingled with the delicate stems of *Ampelopsis veitchii.* The slender, shred-like stems of the main plant were covered with a profusion of scarlet tubular flowers, hanging over and partly covering a few *Alternantheras* with richly colored leaves.

Fig. 69.

"I recollect a pair of broad, yet very shallow vases, situated on either side of one of our finest residences near Philadelphia, and, although some months since, the picture appears as fresh to my mental vision as if but yesterday. These ornaments were not two feet high, and were placed upon the ground without pedestals. The surface of one was completely covered with the metallic leaves of an *Echeveria*—the other with a very dwarf *Alternanthera.* Around the base of each was a bed of some large-leaved ivy, encircled with a ring of the variegated variety."

A pillar, like that represented in fig. 69, may be

Fig. 70.—*Morning-Glory Clinging to Spruce.*

occasionally introduced for the sake of variety. Like the preceding figure, it is copied from a specimen on Ellwanger & Barry's grounds, and represents a cedar stake fifteen feet high, covered with stubs about six inches long from bottom to top, and the whole hid by the foliage of the more ram-

pant growing species of convolvulus. The mass of foliage was nearly a foot in diameter.

Hardy climbers, such as *Clematis virginica*, the Trumpet Creeper, Virginian Creeper, Bittersweet or *Celastrus*, *Periploca*, &c., may always be introduced into the less polished portions of ornamental grounds, and in whatever way they may run or be trained, will always present a pleasing appearance. The half dead or half decayed trunks and limbs of old trees may be covered by them and rendered beautiful objects. Instead of providing special and formal supports for climbers, if they are trained on such objects as exist already on the grounds, a better effect is produced. Fig. 70 is a sketch from a plant of the morning-glory, planted at the margin of a flower bed, and clinging to the extreme ends of the branches of a neighboring Norway spruce, forming a graceful, free and pleasing group.

For the purpose of assisting in the formation of beds, the following list of bulbous and herbaceous perennial plants is presented, and shows the seasons of their blooming in Western New-York, taken from a record extending through three seasons, the average being given:

Snowdrop, the earliest, begins to appear March 4, extending through the month.

Crocus: the yellow, white, striped, purple and other varieties begin to bloom in March, and continue one or two weeks into April.

Eranthis hyemalis is in bloom about the same time.

Pansies appear nearly as early, and continue, if favored with shade and moisture, throughout the season.

Bulbocodium vernum appears early in April. The *Persian Iris* and the *Siberian Squill* are also in bloom, the Squill often in March.

Among the wild flowers, *Hepatica* and *Claytonia* open from the 1st to the 15th of April.

The seasons for all the earliest of the preceding extend into those that follow, and they may be employed with great advantage in the same beds.

Immediately following these are the Sweet-Scented Violet, Daisy, English Cowslip, *Adonis vernalis*, *Erythronium*, Hyacinth, *Sanguinaria* and the earliest Tulips and Narcissus. It will be remembered that the periods vary with seasons and with exposure, the flowers appearing much sooner under the south shelter of a wall or building than if fully exposed to winds.

During the middle and latter part of April the following plants appear in bloom—Tulips, Crown Imperials, Jonquils, Auriculas and Moss Pink, and also the following handsome, but less showy, native plants: *Anemone thalictroides*, *Houstonia cœrulea*, *Dentaria laciniata*, *Corydalis cucularia*, *Caltha palustris*, *Collinsia verna*, *Pulmonaria virginica*, *Phlox divaricata*, &c.

Early in May appear *Aquilegea canadensis* or American Columbine, *Trillium erectum* and *grandiflorum*, *Oxalis violacea*, *Dodecatheon*, *Phlox maculata*, and many other ornamental herbaceous perennials. After these, flowering plants extend over wider periods, and bedding plants and annuals begin to furnish a continued and brilliant bloom.

Several of the smaller shrubs may be employed for the central portions of the beds, and the following are the dates at which they appear:

Mezereum, early in April; Cornelian Cherry, a week later, and Scarlet Flowering Currant and Yellow Flowering Currant; Dwarf Flowering Almond blooms early in May, succeeded by Japan Quince, and two weeks later by Tartarian Honeysuckle.

BULBOUS FLOWERING PLANTS.

A COMPLETE FLOWER GARDEN is not made up of any single class of plants. Bulbs give the most brilliant show early in spring, and some of them through summer; herbaceous perennials display some early spring blossoms, and are valuable for remaining year after year without renewal; bedding plants afford masses of flowers from midsummer till autumn frosts; and annuals, sown each season and well managed, furnish a succession through the whole of summer and autumn. In addition to these, greenhouse plants, under the protection of glass, and with moderate artificial warmth, will give flowers after the late frosts of autumn have destroyed all out-door blooming, and through the entire winter. On the present occasion we devote a few remarks to bulbs.

Fig. 71.—*Snowdrop.*

Fig. 72.—*Crocus.*

The earliest of all spring flowers is the SNOWDROP (fig. 71.) It is often seen in bloom while snowbanks are lying within a few feet. The bulbs are perfectly hardy, and are extremely easy of culture. It is only necessary to plant them and leave them alone, and they will flourish and multiply year after year. The flowers are naturally single; cultivation has given double ones, which are rather larger, but on the whole the single variety is preferable. The bulbs, which are quite small, are to be set out in autumn, in beds or masses, planting them about two inches apart, and two inches deep, pressing the earth compactly about them, to prevent heaving by frost. If planted in pots, they bloom handsomely in winter.

Closely following the Snowdrop in the Siberian Squill, a beautiful deep blue flower, forming brilliant masses in beds, and as hardy and as easy to manage as the Snowdrop.

About the same time the many colored CROCUSES (fig. 72) open. They begin to throw up their leaves before the frost has fairly gone, and the flowers soon follow. Among their various colors are white, yellow, striped and blue. Nothing can exceed the effect produced when thousands of flowers are in bloom in masses at a time. The season lasts some weeks. The bulbs should be planted in autumn, about two inches deep and three inches apart, the earth pressed compactly to prevent heaving by frost, and at the commencement of winter they should be slightly mulched. A little manure once a year, and they will last for years. For winter flowering in the house they may be set in a pot closely together and covered with mould.

Fig. 73.—*Hyacinth.*

The Crocus has scarcely disappeared before the HYACINTH (fig. 73) is in bloom. It stands pre-eminent for beauty and fragrance combined. The flowers are single and double, and present all the shades of blue, light blue, dark blue, red, blush, rose, dark red, yellow, cream and pure white. The bulbs should be planted about mid-autumn, in a deep, dry soil, that has as perfect surface and subsoil drainage as practicable. They may be set about five inches apart, and four inches deep. Before freezing, the bed should be covered with a coating of dry leaves, held down by evergreen brush, for winter protection. This covering must be taken off early in spring, as the frost is passing out of the ground. Vick says :

"Hyacinth flowers may be cut freely, without injury to the bulbs. Indeed, all flower stalks should be removed as soon as the flowers begin to fade. In about five or six weeks after flowering, and when the leaves are becoming yellow, the bulbs may be taken up, dried and packed away in paper bags or boxes, for planting again in the fall. If the beds are needed

for other flowers, as is generally the case, the bulbs may be removed in about two weeks after the flowers have faded. In this case, after removing the flower stems, if this has not been done before, lay the bulbs on a dry bed in the garden, and cover them with a little earth, leaving the leaves exposed. Here they can remain until the leaves have ripened, when they are ready to be packed away for fall planting, or can remain where they are until needed.

"Hyacinths will usually commence flowering in this latitude the latter part of March, and by choosing varieties a good show of blossoms can be secured for at least a month or six weeks. The late varieties are mostly double, and are from two to three weeks later than the early sorts. The low sorts throw up a stem five or six inches in height, and the trusses are usually globular and compact. The tall sorts have a flower stem from six to ten inches or more in height, and the trusses are usually more loose."

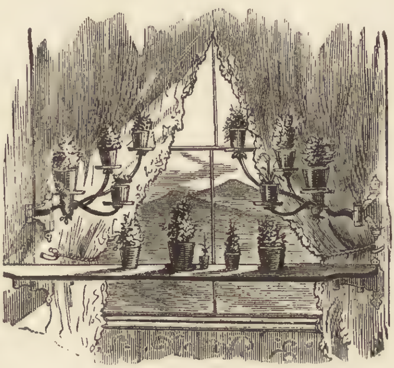


Fig. 74.—*Window with Bracket and Shelf for Hyacinth Pots.*

Hyacinths make a beautiful display for house culture. They are often grown in glasses in water, but this exhausts the bulb, and either destroys it or weakens it so much as to require a year or two to recover. A better way is to plant in pots, nearly covering the bulb compactly with soil, after which the pots are placed in a cool, dark cellar for several weeks, where roots will form with little growth of the stem. When wanted for blooming, bring them into a warm room. By thus taking a few at a time, at intervals of a week, a succession of flowers may be kept up for a long time.

Hyacinths in masses produce a pleasing and brilliant appearance when planted in circular or elliptical beds, with belts of colors extending around them. If the beds are small, each may have its mass of one color, and several groups together may afford an admirable display.

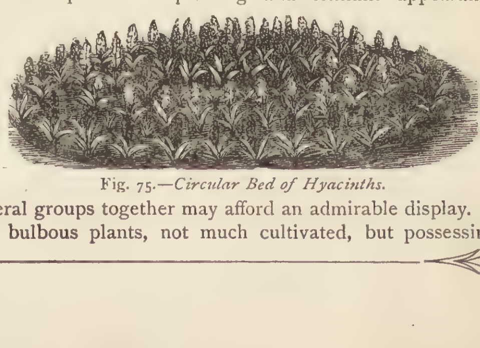


Fig. 75.—*Circular Bed of Hyacinths.*

Two species of bulbous plants, not much cultivated, but possessing

much beauty, are the Spring and Summer Snowflake, (*Leucojum vernum* and *L æstivum*,) the first a spring flower, and the latter a later bloomer. They are easily cultivated.

Fig. 76.—*Spring Snowflake.*

Fig. 77.—*Summer Snowflake.*

The NARCISSUS is an extensive genus of flowering plants, and some of the species are the most common and most easily raised of all bulbous flowers. They follow closely after the Hyacinth. One of the finest is the *Narcissus bulbocodium*, sometimes called the Hoop Petticoat Daffodil. The common single Narcissus is perfectly hardy; the bulbs should be set in autumn, and when once planted out and established, will remain and take care of themselves for years. The Jonquil (*Narcissus jonquilla*) is a

Fig. 78.—*Narcissus bulbocodium.*

Fig. 79.—*Jonquil.*

deliciously-scented species, and is both single and double. The plants increase by producing a multitude of bulbs, each sending up trusses of flowers. *Narcissus incomparabilis*, (fig. 80,) sometimes called "Butter and Eggs," is a fine, showy sort from Portugal, and there is a double variety. *Narcissus poeticus*, (fig. 81,) or Poet's Narcissus, sometimes called Pheasant's Eye, is later than the preceding, and is one of the finest ornaments of the garden during its season. The flower is white, with a cream-colored

cup and a delicate fringe of red. The most beautiful species is *N. Tazetta*, or *Polyanthus Narcissus*, of which there are many fine varieties, some clear white, and others yellow, with many intermediate shades, and the flowers are produced in clusters of half a dozen to a dozen or more. This species is not quite hardy, and requires some winter covering, but the finest flowers are produced in a greenhouse. *N. bicolor* is a fine species, the flowers white, with a crown of brilliant yellow. *N. orientalis*, (fig. 82,) from the Levant, has not been much cultivated. The flowers are pale yellow, and grow in clusters of about ten each.

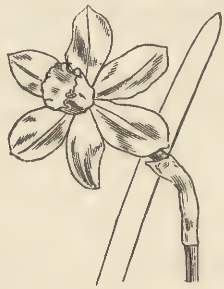


Fig. 80.—*Narcissus incomparabilis.*

Fig. 81.—*Narcissus poeticus.*

Fig. 82.—*Narcissus orientalis.*

Fig. 83.—*Tulip.*

THE TULIP.—This gorgeous and brilliant flower furnishes a succession of bloom for several weeks, beginning (while the hyacinths are yet in flower) with the earliest varieties, and ending with the taller and later sorts. The bulbs should be planted in October, five or six inches apart, the distance varying with the size of the variety—and four inches deep; and the bed should be covered on the approach of winter with a thin layer of leaves or litter—removing the covering early in spring. The soil need not be so rich as with some bulbs, but should be dug deep, (18 or 20 inches,) and the drainage should be perfect. Where rare sorts are to be preserved and kept separate, the bulbs are taken up when the leaves die, and are kept dry for autumn planting; but where no special care is desired, they may be allowed to remain in the ground for years, when they will continue to bloom.

The earliest Tulip is the *Duc von Thol*, with its varieties. It is small, distinguished by being shaded yellow on red, and is single and double.

Fig. 84.—*Border of Tulips.*

Where there are large beds of taller tulips, this dwarf sort forms a good edging. After the *Duc von Thol* follow a brilliant array of common single tulips, scarlet, vermilion, yellow, extra scarlet, variously striped and intermingled. Double tulips are admired by many, but they are not free from an appearance of coarseness and heaviness. Parrot tulips (fig. 86) have a ragged or fringed and exceedingly gorgeous appearance.

Fig. 85.—*Tulips Grown in Pot.*

The accompanying cuts (figures 84 and 85) represent tulips grown in beds and pots, and are furnished by James Vick of Rochester.

The LILY is one of the most ornamental of all summer flowers, and is distinguished for its grace and elegance. Out of nearly a hundred species, a large portion possess distinguished beauty, from the old White and Tiger lilies to the Japan and Golden lilies of more recent introduction.

Nearly all the species are hardy, and

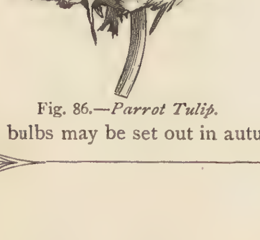


Fig. 86.—*Parrot Tulip.*

Fig. 87.—*White Lily.*

the bulbs may be set out in autumn, nearly a foot apart, and from three to

five inches deep, acording to their size, in a deep, well-drained garden loam, made rich if necessary, with well-rotted manure, and rendered friable, if tenacious, by an admixture of sharp sand. If the soil is quite heavy, the addition of a handful of sand placed around each bulb will prevent rotting. The white lily should be transplanted in August, as it makes some autumn growth. As the bulbs of most lilies are injured by drying, they should be kept out of the ground as short a period as practicable. All the hardy sorts flourish and flower best if they remain several years without removal.

Fig. 88.—*L. longiflorum.*

Among the finest species are the old White lily (*L. candidum*,) fig. 87; Tiger lily, (*L. tigrinum* ;) Trumpet lily, (*L. longiflorum*,) fig. 88, which is pure white, and the flowers often five inches long; Scarlet lily, (*L. chalcedonicum*,) a showy species, with scarlet flowers; the new Golden lily, (*L. auratum*,) figs. 89 and 90, with very large flowers, and a golden band on each petal; and the Japan lilies, (*L. lancifolium.*) figs. 91 and 92, which are the finest of the whole genus, and "no description," says Vick, "can do any justice to these flowers, or show the beautiful frost-like white of the surface, glistening like crystals and diamonds, or rubies that stand out on the surface." There are several varieties, presenting white, rose-mottled and crimson-dotted petals.

Fig. 89.—*Lilium auratum.*

Fig. 90.—*Flower of same, enlarged.*

There are two native lilies that should not be omitted in any bulb

Fig. 91 —*Lilium lancifolium.*

Fig. 92.—*Flower of the same.*

garden. The Meadow lily (*L. canadense*,) figs. 93 and 94, although not so showy as some other species, is unequalled for its graceful form; and the

Fig. 93.—*Lilium canadense.*

Fig. 94.—*Lilium canadense flavum.*

fact that it grows and flourishes for years in grass fields, shows that it would remain and bloom without care in gardens or door-yards, when

once established. The Wood lily (*L. philadelphicum*) has erect, brilliant orange-red flowers, and is well adapted to shaded places under trees.

Tender Bulbs.

The Tuberose (*Polianthes tuberosa*) is greatly admired for its deliciously fragrant flowers, and is raised in suburban hot-houses in large quantities, and sold for wreaths. In the northern States the seasons are not long enough for the plants to bloom without some artificial heat to start them. Much depends on the selection of good bulbs, or such as have a clear skin, and are very firm, not long at the top, and sound at the heart. They may be started in a hot-bed, or they may be first set in pots in a dark, warm closet, where the frost can never reach them, and where they will strike root in about three weeks, and then grown further in a hot-bed. They are set out in open ground after all danger of spring frosts has passed. The best soil is rich loam mixed with sand. They will bloom by midsummer under good management, and continue through summer and autumn if care is taken to secure a succession. The bulbs will not flower a second time, but new bulbs will be formed from vigorous roots, which must be taken up before frost, the stalks cut off near them, and the roots kept in a warm, dry closet for winter.

Fig. 95.—*Tuberose.*

E. S. Rand of Boston gives a method of raising the tuberose, by which he says they may be as easily grown as potatoes, and which was first practiced by E. W. Buswell of that place. It is in substance as follows: Choose good, hard, healthy bulbs, and clean them by rubbing off all offsets and protuberances. They are to be planted in a gentle hot-bed, which is most easily prepared by digging a space two feet deep with a dry bottom. Make a box of inch boards a foot wide, (without top or bottom,) and set it on the dug space. Then bank up against it outside with the earth thrown out of the space. Then fill the space inside with a foot and a half of coarse horse manure, and put a sash over the box, and the hot-bed is made. When the heat is up, plant the bulbs in seven-inch pots, filled with mixed loam, sand and peat, and add a small portion of old manure and powdered charcoal, after having filled the pots half full of crumbled old cow manure. Plant a bulb in the centre of each pot, with the crown at the surface. Set these pots in the hot-bed, covering with spent tan an inch; water well with a fine watering pot, cover with the sash, and the work is done. In a week give a little air if the weather is sunny and the heat of the bed fierce, covering the sash with a board or shutter. In a week or so, when the green tops appear above the tan, give more air and water, removing the shutter. Keep a moist, warm air to make them grow rapidly, and admit enough air from the outside to prevent growing slender. Gradually take off the sash on warm days, and cover cool nights. Early in June the cover may be left

off wholly. The warmer the aspect, the better they will grow. A constant supply of water is indispensable—never intermit. Tie the flower stalks, as they grow, to neat stakes. As the flowers expand, the pots may be lifted to the veranda or balcony. Later plantings will give a succession till mid-autumn.

The name *Tuberose* is frequently pronounced in two syllables; Tube-rose, as if it belonged to the genus *Rosa*—to which, however, it has not the slightest affinity. The name comes from the *tuberous* root of the *Polianthes tuberosa*, the botanic name of the plant, and should be pronounced in three syllables.


Fig. 96.—*Tritoma uvaria.*

TRITOMA UVARIA (fig. 96) throws up a large and very showy spike of yellow and scarlet flowers, which continue for a long period. The root is tender, but flourishes best when left in ground over winter, covered with a few inches of leaves. Rand says the most effective mode of placing this showy and brilliant ornamental is to put about a dozen plants in a deep, rich bed, eight feet in diameter, on the lawn, giving plenty of room to each plant, and they will cover the bed with foliage, with plenty of flowers, and each year grow better. They bloom in August and till mid-autumn.

The GLADIOLUS is one of the finest and most beautiful of all summer flowers, and the bulbs throw up tall spikes, which exhibit many shades of color—scarlet, crimson, cream white, striped, fiery red, rose, clouded, and with various tints of yellow, lilac, rose, violet and pink. The bulbs should be planted six or eight inches apart, and three inches deep, and if set out at different periods till June, a succession will be afforded. The bulbs, being tender, should be taken up in autumn, cleaned, and stored in an apartment free from frost and moisture.

BULBS AFTER FLOWERING.—When bulbs have been flowered in water, they should, as soon as the flowers begin to fade, be removed and planted in earth, where they will get a little nourishment. Even then the bulb is much weakened, and it is useless to try to flower bulbs in water twice. All bulbs with annual roots, which includes pretty much all but the lilies, can be taken up as soon as the leaves become ripe and brown, and be stowed away without the least injury to the flowers of the next season, because the roots will die if the bulbs are allowed to remain in the ground. After taking them up, allow them to dry in the shade for a few days. Then remove the tops, roots and rough skin, and put them away in paper bags, properly labelled, in a cool place in the house until planting time in the autumn.—*Vick's Floral Guide.*

NOTES ON FRUIT CULTURE.

Peaches—Varieties and Management.

IDEAS FROM DELAWARE.—From a report of a committee of one of the New-Jersey Agricultural Societies, who visited Delaware, we glean and condense the following in relation to the requisites of peach culture: 1. To prepare thoroughly, clear and enrich the soil for planting. 2. To give plenty of room, or plant 25 or 30 feet apart. 3. Not to shorten in the branches. 4. To do a great deal of work among the trees—plowing, harrowing, cultivating, and allowing no grass or weeds. 5. To hunt the borers once a year, in autumn. 6. No raising corn and potatoes, except the first three years, in the orchard, and then only provided fertilizers are applied. 7. After the third year to plant nothing, but cultivate thoroughly. The objection to shortening-in the shoots is that it tends to unproductiveness, and the formation of a dense, unyielding head, and increases the difficulty of gathering the fruit. It is obvious that when performed, the necessary thinning in connection with shortening back was omitted. It may be impracticable to do this on a large scale, or in hundred-acre orchards. In some localities this cutting back has been found the easiest way to effect the desired thinning of the fruit—an operation that has tripled the size of the peaches, and tripled their price, in cases which we have known. Cutting back, if properly done, increases the vigor of the trees, and makes old trees bear the large fine specimens commonly found only on young trees; yet it may be adapted to amateur culture only, in ordinary practice. The thorough cultivation was believed by owners to keep the curculios within bounds, and so rapid was the growth imparted to the trees, that orchards only four years old had trees with heads 20 feet in diameter and 15 feet high. The cultivators are broad, reaching nearly half way from row to row, and doing work rapidly. The varieties preferred are Troth's Early, Early York, Stump the World, Crawford's Early, Oldmixon Free and Crawford's Late. Hale's Early has failed from its liability to rot.

The Best Varieties.—Wm. Parry furnished the following select list of peaches for profit in New-Jersey, at a meeting of the Pennsylvania Fruit-Growers' Society, giving a succession from earliest to latest: Hale's Early, Troth's Early, Mountain Rose, Large Early York, Crawford's Early, Oldmixon Free, Stump the World, Ward's Late Free, Harker's Seedling, Late Rareripe, Crawford's Late, Beer's Smock, Heath Cling and Salway. The latest of these would not ripen well as far north as New-York State. After giving some very successful experiments with peach culture, he adds the following, which we furnish, so as to give both sides: A man bought 1,000 peach trees, to plant on ten acres, and put them in charge of a tenant. He took

a yoke of oxen and went into the peach orchard to plow; but finding the young trees in the way of his team, concluded to pull them up and heel them in along the fence, while he finished the plowing. The owner afterwards concluded that peach-growing did not pay.

The members of the AMERICAN POMOLOGICAL SOCIETY expressed their opinions by voting as follows: Crawford's Early, 12 double stars and 10 single; Heath Cling and Oldmixon Cling, each 10 double and 10 single; Oldmixon Free, 9 double and 8 single; Large Early York, 7 double and 11 single; Columbia, 7 double and 9 single, mostly in the South; Grosse Mignonne, 5 double and 15 single; Lemon Cling, 6 double and 10 single; Crawford's Late, 5 double and 11 single; Troth's Early, 1 double and 16 single; Early Tillotson, 3 double and 9 single, mostly south; Susquehanna, 5 of each, mostly south; Cole's Early Red, 2 double and 9 single; Cooledge's Favorite, 1 double and 11 single; and the following with smaller votes, viz.: Amelia (a highly esteemed southern sort,) Barnard, Bergen's Yellow, Druid Hill, Haines' Early Red, Indian Blood Cling (southern,) Lady Parham (excellent southern variety,) La Grange, Large White Cling, Morris White and Yellow St. John of the South.

PRUNING AND THINNING.—One of the most successful fruit raisers in Western New-York once informed us that by removing two-thirds of the young fruit from his peach trees, the peaches grew so much larger that he had as many bushels as on the unthinned trees, and that while the latter would scarcely bring fifty cents per basket, the large and excellent fruit resulting from thinning sold readily for a dollar and a half. Another proof of the advantage of this process is furnished by Dr. Hull's orchard (as reported in the Alton Telegraph) in Southern Illinois—a "model orchard" of 1,800 trees, affording in 1872 nearly 10,000 baskets; and while ordinary peaches went begging for buyers at from 25 to 50 cents, these 10,000 found ready sale at 75 cents to $1.25. "So much for pruning and thinning, and careful picking and packing."

RAISING AND SHIPPING PEARS.

RE-GRAFTING DWARF PEARS.—There are some varieties of the pear which are either found unsuited to certain localities, or their quality does not come up to the owner's expectations. Such trees are easily changed to better sorts by re-grafting. First cut off the limbs in the form of a regular pyramid, leaving the bottom ones longest, and gradually growing shorter upwards, so as to leave a regular taper towards the top. Let them be at regular distances. Into these stumps set the grafts. Fig. 97 represents a tree after the grafts have grown one year, even and symmetrical in form.

There are some badly shaped trees, which will be more irregular in appearance when re-grafted, as in fig 98, but these will nevertheless make valuable trees. We have seen many trees eight or nine years old worked over in this way, which in three years bore abundant crops.

Unprofitable trees may be easily changed to the Bartlett, a sort which grows finely when it thus becomes double worked.

Fig. 97.

Fig. 98.

Packing Pears for Conveyance by Railroad.—For marketing by the quantity, the best way is to pack them in half-barrels. Remove one head, and turn the barrel upside down, so that the pears put in first will open at the top when they are to be taken out for use. Procure a quantity of white printing paper, for lining the half-barrels. This will give the whole a neat, finished appearance, preserve the pears better, and give them a higher price. First place a folded sheet in the bottom, and then a layer of pears over it, and proceed to fill the barrel by laying the specimens in compactly, shaking occasionally very slightly, to settle them. It is of great importance that they be packed as closely as possible without bruising, so that they will not work loose on the way; for as soon as they begin to "rattle" in the barrel they are inevitably ruined. We have known handsome pears, which would have brought ten or twelve dollars a barrel, completely spoiled by being placed loosely and carelessly in the barrel. As they are filled in, line the sides with white paper, and cover the top well with it. Let the top surface of the pears be about three-fourths of an inch above the lower surface of the inserted head, so that when the head is borne down by the screw or lever, it shall press them down three-fourths of an inch. This will bring them closely and firmly together, and prevent rattling—the elasticity of the fruit admitting of this pressure. It is better to have the surface project upwards an inch, than less than three-fourths. Never put in mellow specimens for long conveyance—two or three in a package will cause the whole to yield, become loose, and be spoiled. Mark the direction neatly, and they will sell better than if marked carelessly or in a bungling manner. For sending a few specimens of fine fruit, each should

be wrapped in soft paper, and all packed in bran, clean soft chaff, or dry moss, the elasticity of which will prevent the bruising of the pears, especially if each is well surrounded by the packing. The upper surface must be a little rounded, so that the lid will press them firmly. We have received fine pears from California packed in this way, as fresh as when picked from the tree.

BEST VARIETIES.—Henry Ward Beecher gives a good list of pears, as follows: *Early*—Giffard, Tyson, Rostiezer. *Early Autumn*—Bartlett, Belle Lucrative, Seckel, Louise Bonne of Jersey. *Late Autumn*—Beurre Bosc, Beurre d'Anjou, Sheldon, Duchess d'Angouleme. *Winter*—Winkfield, Lawrence, Winter Nelis. We would prefix to his early list, Doyenne d'Ete—for although small, and not of the highest quality, it is some weeks earlier than any named, and the tree is a great and constant bearer. We should certainly add Josephine de Malines to the winter list, as, although not succeeding well in some localities, it is commonly very fine and agreeable, and comes in immediately after the Lawrence and Winter Nelis are gone.

TO COLOR PEARS.—Josiah Hoopes, the well known West Chester, Pa., nurseryman, says that to give a high color to pears "all that is necessary will be to spread a blanket on the floor of a cool room, and then thinly and evenly place the fruit on the floor. A second blanket must be spread over them, and in a short time the effect of this treatment will be apparent in the most golden colored Bartletts, and rich, ruddy-looking Seckels imaginable. Pears perfected in this manner rarely have the mealiness of their naturally ripened companions; nor do they prematurely decay at the core, as when left on the trees."

OBVIATING ORCHARD ANNOYANCES.

CANKER-WORM PROTECTOR.—One of the best contrivances which we have met with, for protecting fruit trees against the ascent of canker-worms, is that which C. L. JONES of Newark, N. J., has successfully used for several years, and by which, he informs us, he has never failed to save a tree, and it is attended with little trouble.

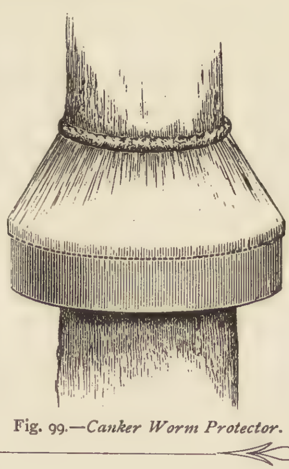


Fig. 99.—*Canker Worm Protector.*

Fig. 99 is a view of the contrivance, which consists essentially of a band or circle of tin, a few inches outside the trunk of the tree, and held there by a circle of muslin, attached to the tin at its edge, and drawn with a cord at the top, so as to fit the tree closely, and prevent the insects from getting up without going over the tin, covered with

a mixture of castor-oil and kerosene, which as soon as they touch, they drop to the ground. Fig. 100 is a section of the contrivance, and fig. 101 a section of the union of the tin and muslin, effected by turning over the upper edge of the tin before it is bent to a circle, inserting the edge of the muslin, and hammering them together. The tin may be about three inches wide, and long enough to rest three or four inches off from the trunk, when bent around in the form of a a hoop, and secured by rivets or small tacks. After the tin and muslin are attached to the tree, the whole inner or lower surface of the tin is daubed with a mixture of equal parts of kerosene and castor-oil. The tin and muslin entirely protect the oil from the sun and weather, and it will not dry for several days. It will not run down, as the castor-oil thickens it. Of course it needs occasional renewal, with a small brush or feather. This protector is kept on the tree till the worms disappear.

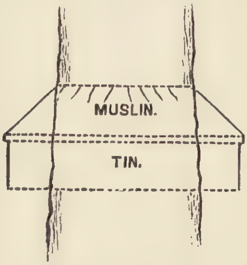


Fig. 100.—*Section.*

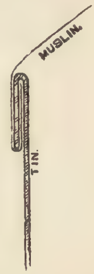


Fig. 101.

The canker worm crawls up the tree till it reaches the lower or inner side of the muslin, when it turns and passes down the muslin till it touches the tin covered with oil, when it almost instantly falls to the ground disabled. Mr. Jones writes: "I have found the ground covered with the dead, and have seen hundreds on their march up the tree, but not one that succeeded in passing. I have now a very large Black Tartarian cherry tree that I saved some five years ago, when my neighbors lost theirs, every leaf being utterly eaten up." This protector is applied to the tree before the ground opens in spring, and is kept on till every indication of the canker worm has gone. An important advantage in this contrivance is the readiness with which it is applied to the tree, with a variation of several inches in size, as well as its cheapness. It is more easily made and more quickly applied than the contrivance represented on p. 231, vol. VI of RURAL AFFAIRS; and on the whole it strikes us as the best thing of the kind we have met with.

ANOTHER CANKER WORM GUARD.—A correspondent of the Agriculturist, who for twenty years had tried many experiments to exclude the canker worm from his trees, has come to the conclusion that the following is simplest and best: He makes bands of sheathing-paper six or eight inches wide, tacks them around the trunks of the trees, and then covers them with refuse printers' ink. The ink costs 12½ cents per pound, requires from two to four applications each season, and the whole cost is about ten cents for each tree annually.

SOAP FOR BORERS.—The Prairie Farmer says that in order to make the

application of soap to the trunks of apple trees entirely effectual for the exclusion of the borer, it is necessary to take very thick soft soap, without diluting, heat it to the boiling point, and then paint the trees freely with it, especially near the ground, and thence up some distance among the branches. It strikes into the bark when thus put on hot, so that one application about the first of June protects the trees for the season, killing the young borers or eggs which happen to be at the surface of the bark. We have never tried this mode, but have used the old one of rubbing with cold soft soap, which always proved useful, but never entirely effectual; and it was always necessary, in order to effect complete extirpation, to go over the trees once or twice a year with the knife and flexible wire. Our readers will of course understand that the soap has no effect on borers already in the wood.

Bark Louse.—Dr. Le Baron, State Entomologist of Illinois, recommends, according to the Prairie Farmer, a wash of soapsuds, of a strength varying with the age of the parts of the tree to which the application is made. A whitewash brush is used, first with strong suds, made of one part soap and three or four of water, and then a wash of a weak solution, or many times diluted, applied with a syringe. This must be done the last of May or early in June, when the young lice are just hatched.

Moss on Fruit Trees.—A correspondent of the London Garden recommends a thin wash of caustic lime, as better than carbolic soap or lye, for the instant removal of moss. We have seen this remedy used with great success in the orchard of A. M. Purdy of Palmyra, N. Y. It was not so thick as to make the trees a glaring white.

Practical Hints.

Transplanting and Pruning.—From an article contributed to the Country Gentleman by Mr. A. L. Hatch of Richland County, Wis., we take the following: Fig. 102 represents a tree as received from the nursery, or as it *should* be. Fig. 103 shows the same as we prepare every one we set, (for young or two-year) trees, *all* the limbs pruned off closely, and the roots shortened in, from six to twelve inches in trees from three to four feet high. Fig. 104 shows the same tree after two summers' growth. Fig. 105 shows the stub roots of a large tree, as they are too often dug, and also the method of pruning the roots with a *slanting* cut from the *under* side. Fig. 106 is intended to show a good firm union of branch and trunk. Fig. 107 shows a mal-formed

Fig. 102

Fig. 103.

fork; the limbs forming too acute an angle, the bark has grown between them, and they will ultimately become diseased at this point.

The objects attained in pruning trees at time of transplanting, as shown in fig. 103, are: 1st. They are surer to live—there is no surplus top to support, and very little demand is made upon the roots until they have become established in the soil and are able to endure it. 2d. By shortening the roots with a clean, smooth cut, always removing injured parts, new crowns of roots are

Fig. 104.

Fig. 105.

Fig. 106.

Fig. 107.

formed from the ends cut, and the tree will be stronger and better rooted in two years than if all the roots had been left on, especially if they are long and straggling, bruised or cramped in the ground at time of setting. 3d. A central shoot, a main trunk, is maintained—this is important, as it is necessary to the best development of a tree that there should be a centre of vitality, a leading part to the tree; trees with two or more leaders or trunks are never as satisfactory as those with a good central trunk; beside which, they are more liable to disease at the forks, to splitting and breaking with winds, especially when cropped. 4th. We shall secure a uniform set of limbs evenly disposed on the trunk. Buds will be thrown out often quite thickly along the trunk after transplanting. Watch and rub off those not wanted, and especially those liable to grow into bad forks, as shown in fig. 107. The limbs should come out at right angles with the trunk as nearly as may be. Here in this climate we should allow the trees to branch low, within three feet of the ground. If higher tops are desired, care should be taken not to prune up from the bottom too fast, for if the growth is all thrown into the top branches, it will often cause them to become top-heavy and bend the trunk, before it has had time to develop in size. Better take two or three years for it. The foregoing plan I have fully tested, and know it to be the best.

Taking up Fruit Trees.—A great improvement has been made of late years by nurserymen generally, in taking up young trees, but we

sometimes see those which have been dug by careless workmen, and which we have figured in the accompanying cuts. Some are badly cut or heedlessly torn out by main force, as shown in figs. 108 and 109, and some handsome trees are spoiled by splitting, as in fig. 110. Such trees, if they live at all, require a long time to recover, and need heavy cutting back at the top before setting out. We much prefer a good set of roots, as in fig. 111, even if the tree itself is somewhat crooked. It will be likely to make a vigorous growth, and the crookedness will gradually disappear.

Fig. 108. Fig. 109. Fig. 110. Fig. 111.

PLANTING IN OLD AGE.—We have known landowners to neglect or refuse to plant fruit trees because they were "too old to get the benefit from them." They are partly correct, so far as their reasoning was based on the old way of planting in grass, followed by neglected culture, by which twenty years or more were required for the trees to reach the growth they might attain in five years under the best care. We remember the case of the late David Thomas, the pioneer cultivator of fine fruit in Western New-York. After he had long passed a half century of years, and his head was whitened by age, he commenced planting the large fruit garden which was afterwards so widely known to his pomological friends. Some of his acquaintances, who knew little of improved tree culture at that early day, "wondered what he was setting out those trees for—he could never expect to live long enough to get any fruit from them." But the trees did bear in time for him to eat of the fruit, for they were set out and managed in the best manner; and for more than twenty years from the time they began to bear, he enjoyed from them an abundance of delicious crops of peaches, apricots, plums, pears and cherries, which many of his friends can well remember for their rareness and excellence. It was an old rhyme that "he who plants pears, plants for his heirs;" but modern cultivators have learned better, and can have good fruit the third year, by selecting early bearers, and taking care of the trees. The Bartlett, Julienne, Belle Lucrative, Summer Doyenne, Howell,

Giffard, Seckel, and several other sorts, come quickly into bearing even if not worked as dwarfs. A similar selection may be made of early and later apples. The smaller fruits and grapes give even a quicker return, as, for instance, strawberries in full bearing in one year, raspberries and blackberries in two and three years, and currants in moderate quantities as soon as the bushes attain any size, and abundantly as they are larger.

HEELING-IN TREES.—The Gardener's Monthly says: "We have no doubt that more trees are lost from imperfect heeling-in, than from any other cause whatever," which every observing person who has seen the way in which the roots of trees are buried in masses, with large interstices of air everywhere among the roots, will assent to. Trees badly heeled-in should not remain so twenty-four hours before planting out. Clods and masses of earth are merely thrown on the top of the roots, and only shade them from the sun's rays. In a few days the roots will become dry, because they are not in contact with the moist earth. If the heeling-in is well performed, *every crack and crevice will be compactly filled with fine, pulverized earth*, and the trees will keep a long time, as well as in the nursery rows. If badly heeled-in, in autumn, and left till spring, trees are nearly if not wholly ruined, by freezing and drying combined.

A Garden of Small Fruits.

Many inquiries are made for plans of gardens for small fruits, and the modes for cultivating them, so as to obtain the best results for a small expenditure of labor. The following plan, with a selected list of some of the crops to be cultivated, will answer these inquiries. The mode of laying out will be governed somewhat by circumstances. If the owner can occasionally have the services of a horse to cultivate the ground, the labor of keeping the soil clean and mellow at all times would be considerably lessened by doing much of the work by horse power, by means of a small plow, common cultivator, and fine one-horse harrow, employing each as circumstances require—the plow for deepening and turning over, and the light harrow for *killing the weeds before they come up*—the easiest and cheapest way of doing it, and the best for the plants. A single sweep of such a harrow, pulverizing the surface, will grind to powder and destroy all the weeds as they are just coming to the top of the ground; but if they are allowed to grow half a foot high, the labor will be increased more than twenty-fold. If all the work of killing weeds is left for hand labor, it is equally important that the surface be raked in the same way, before the weeds appear, to kill them as they are starting.

In laying out a piece of ground for horse cultivation (so far as it can be adopted) the rows should all run in one direction, as shown on the next page, (fig. 112.) We have represented the piece of ground nearly square, but the same mode of laying out may be adapted to any other shape. For horse culture the rows should run the longest way, to obviate turning about oftener than necessary, and to save ground at the ends for turning upon. If land is scarce and labor plenty, it will be better to extend

the rows to the ends of the garden, and do all the work by spading, hoeing and raking by hand. The appearance of this garden will be neater under hand cultivation, but a good appearance may be maintained by the use of the horse, if the weeds are always kept low, so that the plow will not have to be often employed, but the surface kept clean, smooth and mellow, by using the cultivator and harrow at least once a week.

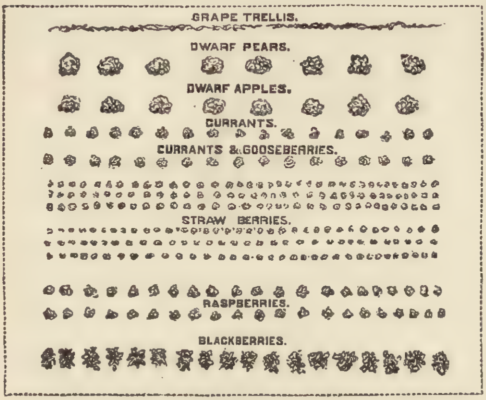


Fig. 112.

The kinds of fruits which we designate in the figure will, under good care, afford an abundant supply for a family from early summer till winter, besides a large amount in favorable seasons for drying, canning and preserving. We begin with strawberries; we have two beds, each four feet wide and some six rods long. These, under hill culture, will give from a hundred to a hundred and fifty quarts yearly, except when one or the other is spaded up, manured and replanted. There should be about three times as many currant as gooseberry bushes, and half of one of the rows will be enough of the latter. These, in connection with raspberries and early pears and apples, will carry on the succession towards the end of summer, when blackberries, early grapes and autumn pears and apples will follow. The distances at which these several kinds of fruit may be planted should be as follows:

Strawberries, for horse cultivation, in rows two feet apart, and a foot in the row. The distance apart need not be much different for hand culture.

Currants and gooseberries, rows about five feet apart, and three or four feet asunder in the row. For raspberries the distance may be about the same, with rows five or six feet apart.

Blackberries should be in rows six or eight feet apart, and with plants two or three feet in the row, and to have them within reasonable bounds, and to secure heavy crops, all the shoots must be pinched in early summer, when three or four feet high, and kept within bounds by successive pinchings through the summer. This is infinitely better than to allow them to run wild, and to cut in the stragglers and side shoots the following spring.

Dwarf apples (on Paradise stock) should have about the same space as dwarf pears, or about ten feet each way, but this distance, in a small garden,

may be varied with circumstances. Although these are not "small fruits," yet a few trees are not out of place in a small fruit plantation, for supplying summer and autumn pears and apples of the best varieties.

The lines of grapes should be at about the same distance; the strong growers, such as the Concord, Wilder, &c., may be 12 or 15 feet apart in the row, and smaller growers, like the Delaware, two-thirds of this distance. The following are among some of the most approved varieties:

Strawberries.—The Wilson will stand first for reliability, hardiness and uniform productiveness. When fully ripe, it is good. Among other sorts, that vary in character with productiveness, and which are often or sometimes very fine, are Nicanor (for very early,) Agriculturist, Charles Downing and Kentucky, and Jucunda for late. The old varieties, Early Scarlet, Hovey's Seedling, Burr's New Pine and Triomphe de Gand are valuable sorts in many localities. Seth Boyden is a very promising new sort, as well as President Wilder.

Raspberries.—The Blackcaps are most hardy and reliable, but not so large and fine as the Antwerp sorts, among which the Clarke is perhaps the hardiest, although the berries are often imperfect. The Franconia is a valuable variety. Among the Blackcaps select Davison's Thornless, Doolittle, Seneca Blackcap and Mammoth Cluster. The Philadelphia is a rather small berry, of moderate flavor, but the bush is very hardy and profusely productive.

Blackberries.—The best two for home use are the Dorchester and Kittatinny—the latter very hardy, productive and valuable. The Wilson and New-Rochelle are half tender at the North.

Currants.—The old Red and White Dutch are valuable sorts; the White Grape very large and excellent; the bush a slow grower. The Cherry and Versailles are very large red varieties, and mixed with the White Grape present a fine appearance on the table.

The English *Gooseberries* sometimes bear well in this country, but for certainty and reliability, take the smaller, hardier and more productive American varieties, among which the old Houghton still stands as one of the best.

STRAWBERRIES FOR THE UNITED STATES.—The following summary, condensed from the Catalogue of the American Pomological Society, will show the comparative popularity of the different well known sorts through the States. Wilson's Albany stands far above all others, having double stars in fourteen States and single stars in twelve others. There are but three States which give any report and do not include it, namely: Kentucky, Tennessee and Texas. Next to this are Triomphe de Gand, which has double stars in five States and single stars in ten, and Longworth's Prolific, which has four double stars and sixteen single ones. Agriculturist has thirteen single stars; Charles Downing, nine single and three double; Hovey's Seedling, fifteen single and one double—this one, of course, in Massachusetts; Downer's Prolific and Large Early Scarlet, each

nine single stars ; Green Prolific, eight ; Jenny Lind, seven single and one double ; Ida, five single and one double ; and Boston Pine, five single. Fillmore has one double star for Maryland, and four single in other States. President Wilder gives high promise in fourteen States. Jucunda has but two single stars, namely, in New-York and Pennsylvania. This list and these numbers show very nearly the general popularity of the different varieties.

SUGGESTIONS IN RURAL ECONOMY.

STANCHIONS FOR CATTLE.—A correspondent refers to the form for stanchions figured and described on p. 126, vol. VI, RURAL AFFAIRS, and points out a danger to which they are liable, namely, that the cow will sometimes turn her head around the movable timber *b*, for the purpose of licking herself, and get caught by the horns, and held in great pain for hours, with the risk of breaking her neck. He obviates the difficulty by bolting to the side of each movable piece, a board broad enough to cover the space, as shown in fig. 113.

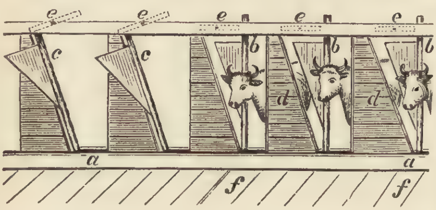


Fig. 113.

Fig. 114 represents the form of stanchions adopted in the barn of Mr. Baum, described on another page, and which are not open to the objection mentioned in the last paragraph—at the same time that they are simple and substantial. The sill, A, which lies on the stable floor, is 5 by 6 inches, the edge or narrow side down. The top-piece or plate, B, is 4 by 5 inches, the broader sides at top and bottom, The fixed plank, C C C, are each 10 inches wide, and $1\frac{1}{2}$ inches thick. The movable plank, D D, are the same in thickness, 4 inches wide at top and 12 inches at bottom. All these are of soft maple, which is not liable to form

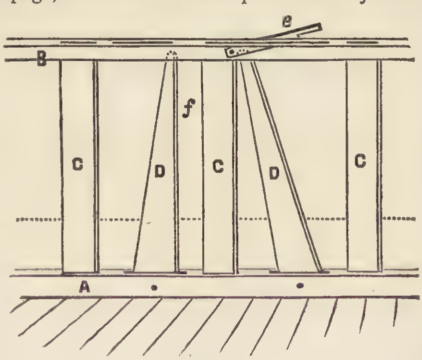


Fig. 114.

splinters on the edges to the injury of the animals. The form of the latch is shown at *e*, and when the movable plank is shut for holding the animals, it drops into a mortice and is not seen, as at the left; when the piece is opened to free the animal, it is raised as at *e*, and drops again when the animal is secured. The whole is simple and easy to manage. The space *f*, for receiving the cow's neck, is 7 inches wide; it was first made 8 inches, but this was found too large. For small animals, six inches will answer. The dotted lines show the height of the manger on the opposite side. This manger is a firm board box, (fig. 115,) sloping towards the animal from the farther side, and is 22 inches high and 2½ feet wide.

Fig. 115.

Neatly Kept Cellars.—The cellar should be the best room or set of rooms in the house. More pains should be taken here than elsewhere, to keep it sweet and pure. It contains more substances that are liable to decay than any other part, such as fruit, vegetables, &c., and foul air rising from it into rooms above, is more detrimental to health. We regret to say that many cellars are badly or almost entirely neglected—damp, mouldy, disordered, and with bad air from decaying substances. On the other hand, we have been much pleased to find, occasionally, cellars that were models of neatness—the floors made with marble like smoothness, by means of hydraulic cement, the walls handsomely plastered, and separate apartments provided for the various purposes of keeping fruit, vegetables, food, coal, &c., by means of solid brick walls. These walls should be eight inches thick, and may be built without difficulty. We have, in our own cellar, divided the whole into five rooms, as follow: 1. Fruit-room, with central shelves, one above another, so that the attendant can pass around on every side, with space also for pear boxes and drawers, the whole capable of complete ventilation by hinged windows. 2. The room for cooked articles, swing shelf, food-safe, &c. 3. Coal and furnace room. 4. Room for potatoes, turnips, &c., which are kept in boxes and barrels—the potatoes in large covered boxes, and the beets, turnips and other vegetables in barrels and smaller boxes, the interstices filled with damp sawdust. 5. Room for empty vegetable boxes, &c. Each of these

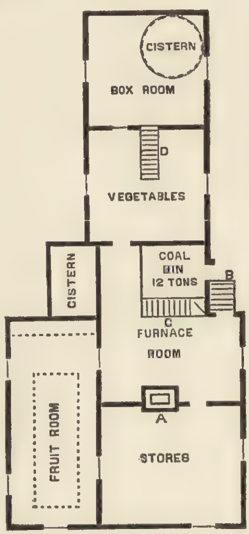


Fig. 116.—*Basement of Dwelling*—A, *Gothic furnace*—B, *outside entrance*—C, *stairs from dining room*—D, *stairs from kitchen.*

rooms will average about 300 square feet, and ample space is thus afforded for the contents. Two of the apartments contain cisterns placed at one side. The whole is represented by fig. 116.

Drainage of Cellars and Sinks.—Nothing can be worse for a cellar, or for the health of the family above, than a want of perfect drainage. Much sickness comes from this very cause. No cellar can be kept pure with puddles of water, or even with air loaded with foul moisture. Where perfect drainage does not now exist, a ditch for this purpose should be at once cut; and if possible, it should go down at least a foot below the cellar bottom at its upper end. The steeper the descent of the ditch, the better will be the drainage. Large pipe tile (not less than three inches bore) is best for the channel; and if there is danger of rats or mice entering, place a fine iron grating across the orifice at the cellar, and a pile of broken stone at the lower end.

Tiles at least two inches in diameter should be laid around the cellar, below the surface, with a descent towards the outlet, so as to convey the water directly to the place of escape.

If there is any probability that the water which escapes from this drain will contain impurities that may cause a current of foul air to issue through the orifice into the cellar, a trap for protection should be attached to the drain. The nearer the drain approaches a level, the greater will be this danger; if it has a good descent, and runs freely, it will be less. The trap may be constructed by different modes, all accomplishing the same object. A good and durable one may be made by placing a small cement cistern or basin about 12 inches deep, near the opening; and across it, on edge, at the top, and extending more than half way down, a piece of flat stone or flagging, so as to divide the small cistern into two parts, but leaving enough space under its lower edge for the water to pass. Fig. 117 represents a cross-section of this trap, A being the cistern, and B the flat stone on edge. The water passes under at A, and no air can get from one side to the other. A good substitute for the cement of the cistern is made by using an oil or paint cask, the wood of which has been thoroughly impregnated with oil, so as to render it durable, setting this in the ground where needed, and inserting a board of durable wood in place of the stone.

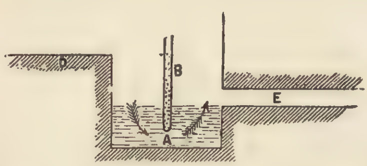


Fig. 117.—*Trap*—A, *basin or cistern*—B, *flag-stone*—D, *cellar bottom*—E, *escape pipe or drain.*

While on this subject, it may be well to speak of the importance of good drainage to kitchen sinks. It is common to connect them with a subterranean channel, through which the slops pass off. But there is a serious difficulty. The grease, found in all dishwater, adheres to the cold sides of the channel, and gradually but certainly chokes it up. A trap something

like the one already described will prevent all this trouble. Or it may be varied as follows: Let the pipe from the sink run down into an underground oil or paint cask, set below frost. This pipe should go nearly to the bottom. Then for an escape pipe bend a good-sized lead tube like a syphon, C, fig. 118, and connect the outer end with the channel or drain. The top of this curved tube should be on a level with the water in the cask. The grease will all rise to the top, and may be skimmed off every two or three months by uncovering it; the water will pass off through the pipe D. The cask may be covered with chaff, sawdust or other non-conductor, and thus be well protected from frost. This covering is readily removed when the grease is to be skimmed off. It is the absence of some contrivance of this kind which makes so much trouble with sink drains, and prevents a pure air in kitchens.

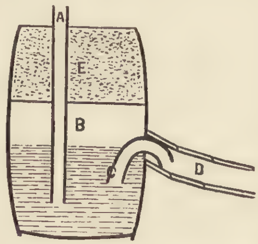


Fig. 118.—*Trap for Kitchen Sink—A, pipe from sink downward—B, oil barrel set underground—C, escape pipe—*D, *cement or tile drain—*E, *chaff or sawdust to exclude frost.*

Convenient Ash Bin.—To avoid the inconveniences of loose ash heaps, W. D. Philbrick has built a very convenient ash bin, which he describes in the Country Gentleman: "I have just built an ash bin in my woodshed, fire-proof, and so convenient that there will be little temptation to put the ashes anywhere else. It is shown in fig. 119—A representing the wall of the shed; B, floor of same; C, bulkhead for discharging ashes into a tip-cart; D, ash-pit, stoned up as far as the surface of the ground, and bricked up above—six feet square in the clear; E E, 2 by 2 inch scantling, laid into the brick wall, to serve as a support for the square sieve, F, which rests upon them, and holds a hodful of ashes and cinders; a movable handle attached to this sieve passes horizontally through a hole in the bricks, so that the sieve can be worked from the outside with the cover closed, avoiding dust. When sifted, the cinders are lifted out by raising the cover, G. I consider this a good investment on the score of fire insurance, to say nothing of convenience and comfort."

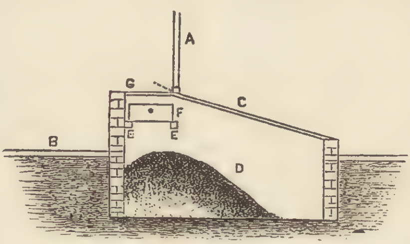


Fig. 119.

Fire-Proof Smoke-House.—During a visit at the residence of Hon. George Geddes of Syracuse, we made a sketch, shown in fig. 120, of the building which he had erected for a smoke-house and store-room.

The room, which faces the house, and is situated on the right end of the building, as represented in the accompanying view, being encased in stone walls, and closed with dark shutters when desired, answers a useful purpose for keeping fruit, fresh meat, and provisions generally. The left-hand

Fig. 120.—*Fire-Proof Smoke-House.*

half of the building is occupied with the smoke-house. The section, fig. 121, shows the position of the different parts. The ash-pit, surrounded by stone walls and a layer of stone beneath, laid in water-lime mortar, and securely coated with the same, keeps the ashes dry, and no water can enter. The ash-pit is entered by an iron door, shown both in the view and section. Over it is a brick arch, containing several holes the size of a half brick, through which the smoke passes into the smoke apartment above—which is entered by the outside door on the left end of the building, by the assistance of a step-ladder. This smoke-room is 6 by 10 feet in the clear. The ventilating window at the end, and the ventilating chimney at the top, are both opened when the hams are smoking, and closely shut when the operation is completed. The top of the arch forms the floor of the smoke-room.

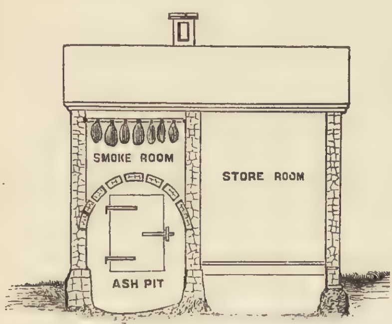


Fig. 121.

A large number of hams may be placed in this room by the following arrangement: Pieces of hard-wood plank, eight inches wide, and long enough to reach across the room, rest on a ledge or projection from the walls on each side. These pieces of plank have hooks driven in on both edges, far enough apart to receive the hams, so that a row may be hung on each side. When full, each is pushed along to one side, and another

filled, and so on till all are in their places. The ventilators above are then opened, and smoke is started on the heap of ashes below. For this purpose cobs are used, or unseasoned maple, or body hickory. The smoking should be slow. By the time the smoke has passed up through the openings in the arch, it has become cold, and cannot heat the hams. Ten or twelve days will usually be enough for the completion of the operation, when the ventilators at the end and in the chimney above are closely shut. The hams being now kept perfectly dark and thoroughly excluded from the air outside, they will keep in good condition; flies will do no injury through the summer with a small fire started once a month, and with the upper ventilator partly open at the time. This obviates the common and troublesome task of encasing the hams in muslin, whitewashing them, or packing them in oats or ashes.

Mr. Geddes suggests double brick hollow walls for the smoke-house, instead of his solid stone walls; also that the rafters be ten inches wide, strongly lathed, plastered, and filled in with sawdust, to keep the apartment cool.

It is obvious that the apartment used as a store-room may be omitted, and the smoke-house built alone. The smoke-room in this building is six by ten feet in the clear, which is larger than most families require. The great points here attained are perfect protection from fire, cool smoke, ready access and handling, and an easy mode of keeping the hams through summer in perfect condition.

STUMP PULLERS.—A correspondent gives us the following improvement on the stump puller figured and described on page 79, vol. I, RURAL AFFAIRS: "Place over the stump to be pulled a frame ten or twelve feet high, or more, made like a capital A, with a dowel of iron projecting above the top to pass through a link of the chain. Place the feet of the frame a little forward of the stump, with the top leaning back 8 or 10 degrees. Fasten chain to a strong root close to stump; pass it to top of frame and thence to lever—[*a*, fig. 122, shows the chain which passes to the lever]—with another chain from lever to fulcrum stump, and you have a cheap machine, by which a good yoke of oxen can easily hoist any stump east of the Rocky Mountains, and they can pull from fifty to one hundred per day if well tended. The chain from stump to top of frame must be very strong. There is no benefit in having wheels on the ends of lever. The frame represents the radius of a circle or spoke of a wheel, the centre of which is at the foot of the frame. If you have but few stumps to pull, you need not have a lever, but hitch the chain to the axle of a cart loaded with earth; if it is not loaded, it will rise from the ground when

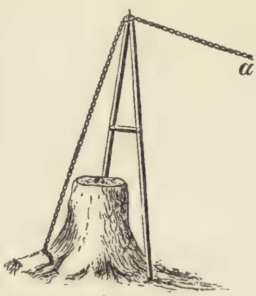


Fig. 122.

the oxen pull, and the oxen could not pull much if hitched to the chain coming down from the top of the frame."

Another correspondent gives still another modification, shown in fig. 123, the form being similar to the one in the first volume of RURAL AFFAIRS, above alluded to, but with the advantage of using three powers, and a post to pull over, as in the one just mentioned. A chain is first used, with two take-up hooks, and a swivel in each. Iron rods, with a hook on one end and a link on the other, are employed to reach out to the stump. Rods and chain enough to reach about twelve or fifteen rods are required.

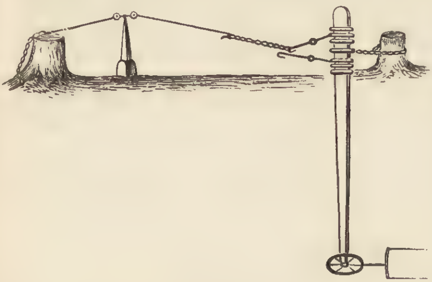


Fig. 123.

IMPROVED SHEEP RACKS.—The New-England Farmer gives an account of sheep racks made and used by T. W. PRADDEX, and described by him as follows: "When I commenced keeping sheep, my feed racks were poor, rough things, without bottoms. The sheep wore the wool from their necks, the chaff and dirt got into the wool, and they wasted considerable hay, as the little lambs would get upon the hay and the sheep would not eat it.

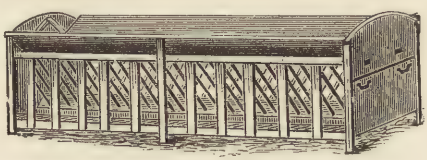


Fig. 124.—*Praddex's Double Sheep Rack.*

Seeing that I needed something better than those rough racks to feed my sheep in, I drew some spruce logs to the mill and had some lumber sawed and went to work myself and built four double racks. A A A A are the feed boxes; B B, ridge into which bottom ends of rounds are inserted; C C C C, rounds; D D D D, raves, the ends of which are also shown at the end of the cut of the rack, fig. 124, below which is a door to facilitate the cleaning of the boxes; E E E E, leaves. The racks are twelve feet long and two feet eight inches wide. There are three posts three by two inches on each side, three feet two inches high, leaving two feet six

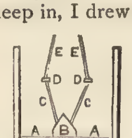


Fig. 125.—*End view, with leaves turned up.*

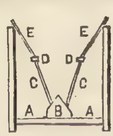


Fig 126.—*End view, with leaves turned down.*

inches from bottom of rack to the top of the post. The lower side board on outside rack is 5 inches by 1; the top side board on outside rack $2\frac{1}{2}$ by 1 inch. The ten slats on each outside of the rack are 5 inches wide; the cross-pieces on the bottom, 3 by 2 inches. Through the centre there is a ridge for the inside rack, 9 inches wide at the base. This leaves about 9 inches on each side for feed boxes; 10 inches from base to point of ridge. On each side of this ridge are inserted thirty-four $\frac{5}{8}$-inch rounds, 4 inches apart from centre to centre. These rounds are set down from the point of ridge 3 inches, and are 15 inches long. The rounds are fastened into a rave $1\frac{1}{2}$ by 1 inch, slanting so as to leave $4\frac{1}{2}$ inches between outside rack and rave. This gives room to sweep out the feed boxes. The raves extend through the end boarding. The leaves are 12 inches wide and half an inch thick, and rest on the raves, and also rest on the top of the outside post. These leaves, by resting on the raves, will turn toward the inside of the rack, without hinges, and rest on cleats screwed on to the inside ends. Doors at the ends. The lumber is all planed, and is half-inch, except that named. The advantages of these racks are: They are light to move; they save hay; the little lambs cannot get upon the hay, for the rounds make a perfect screen; the leaves, by turning towards the inside, are out of the way of the sheep; the feed boxes can be swept handily; the grain and roots can be thrown into the inside rack and run through into the feed boxes at the same time the sheep are eating; the sheep do not wear the wool from their necks, nor get dirt or chaff into their wool. I think the cost of these racks, to buy everything and hire them made, would be about ten dollars apiece."

STONE FENCES.—We gave in a former number of the ANNUAL REGISTER some illustrations of the modes adopted for preventing stone walls from heaving by frost, and becoming thus gradually thrown over. On a late visit to a distinguished farmer, he described another mode, which on light gravelly or sandy soils has been found to succeed well, and to possess some advantages. The accompanying figure is a cross-section of the wall. In the first place the earth is thrown together by the plow, so as to form a ridge between four and five feet wide. The plow is repeatedly passed until this ridge is a foot above the adjacent surface of the ground. On this ridge the wall is built (fig. 127.) When completed, additional earth is thrown up against the bottom of the wall, a foot above the bottom stone. This is made smooth, so as to carry

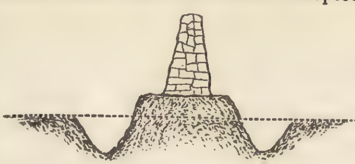


Fig. 127.—*Section of bank, ditches and walls.*

Fig. 128.—*Wall and bank complete.*

off the water of rains freely (fig. 128.) The advantages are the following: A good ditch is made on each side of the wall, which not only carries off surface water, but keeps the bottom of the wall well drained. The ditch and the sloping bank prevent colts from leaning or pushing against the wall, and reduce the necessity of having a high wall. If three feet high, it will form a sufficient barrier in all ordinary cases. The banking up against the foot of the wall is an additional protection, and tends to prevent damage by the heaving of frost.

Corn Marker.—A correspondent of the Country Gentleman gives the following description of what appears to be a good corn marker: "The improvement is simply a 'guide,' made of a board (oak is best) about six inches wide. and if the distance between the outside runners is eight feet, it should be twelve feet and a few inches long, with a small runner *a*, (fig. 130) fastened securely at one end, leaving a couple of inches of the board projecting beyond the side of the runner; twelve feet from the middle of this runner bore an inch hole and another in the middle

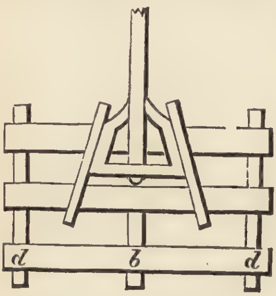


Fig. 129.—*Corn Marker.*

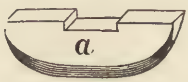


Fig. 130.

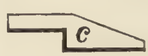


Fig. 131.

runner of the marker, at *b*. A wooden pin, an inch in diameter, with a shoulder at one end, will be needed to fasten the guide to the marker at *b*. Now make two cleats like *c*, (fig. 131,) of some tough wood, and fasten them, shoulder forward, at *d*, to keep the guide right. With this guide it is only necessary to set stakes to mark the outside row, the guide being toward the field. When you have crossed the field, 'gee' or 'haw,' bring the middle runner of the marker into the track made by the guide, and bring the guide toward the field again. By walking behind the marker, the driver can look several rods ahead, and correct any irregularities made in the rows the last time across."

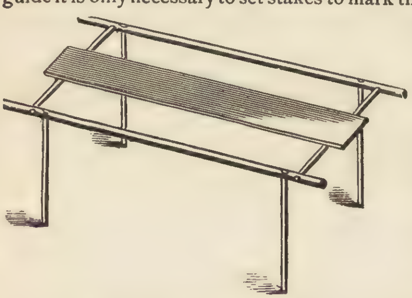


Fig. 132.—*Corn Husking Bench.*

Corn Husking Bench.—F. Graves of Onondaga Co., N. Y., furnishes the Country Gentleman the following description: "This convenient bench is made about seven

feet six inches long, two feet six inches wide, and two feet six inches high; the long sticks of round cedar, and the legs and cross pieces of hickory or any tough wood. Inch and a half auger holes are bored, as shown in the drawing (fig. 132,) the legs and cross-pieces driven snug, and wedged at the ends; nail a light board near the centre, and the bench is made. To load the shock, turn the bench down on its side, grasp the shock around the top, and tip back the bench. No farmer who once uses this husking table will go back to the old cramped, dirty and disagreeable way. In muddy weather, especially, it will be found a great improvement, not only in comfort, but in the saving of stalks."

Fig. 133.—*Brush Drain.*

BRUSH DRAINS.—A correspondent of the COUNTRY GENTLEMAN has brush drains seventeen years old that are in good condition, the success of which appears to be partly owing to the form of the drain, as shown in fig. 133, a shoulder being left on each side of the centre channel, which sustains the pressure from above and prevents the brush from becoming pressed together into a solid mass.

THREE-HORSE PLOW-TREE.—V. P. RICHMOND of Illinois informs us that he finds the following three-horse arrangement to answer the desired purpose better than any other: "The large part of the clevis (*a*) connects the large tree and plow; the small part

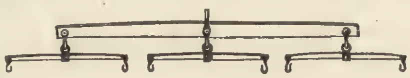


Fig. 134.

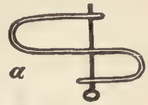


Fig. 135.

carries the single tree, one bolt answering for both. The clevis, working either side up, will place the single tree under or over to suit the team you attach. The traces must be crossed, each horse drawing on two single trees. My experience is that a plow runs steadier with this tree than any attachment I have seen for either two or three horses, and I believe that it will work equally well on farm wagons, using shafts instead of tongue. Any farmer can make the wood-work—any blacksmith can iron. There is no patent, and *never will be.*"

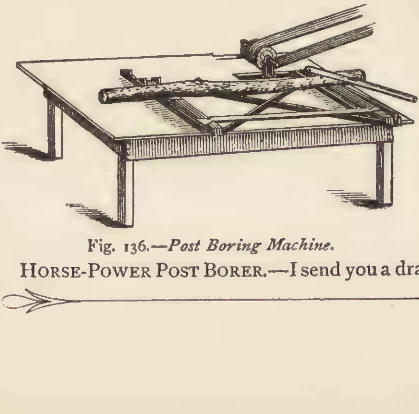


Fig. 136.—*Post Boring Machine.*

HORSE-POWER POST BORER.—I send you a drawing of my machine (fig. 136)

and any one can use who wishes to—it is not patented, nor have I any to sell. With this machine I can bore 250 holes in an hour, enough to make 25 posts, five pins in a post. As will be seen by the drawing, the auger is stationary. The posts lie on the carriage, which runs in grooves 3 feet 4 inches apart, the worm of the auger drawing the post up as fast as it will cut. When through, draw the carriage back by hand, and move the post for another hole. The carriage is 2 feet long, 4 inches high; 6 inches from the end nearest the auger a score is cut, 6 inches long and 2 inches deep, to receive the posts; and as they are more or less crooked, I use a wedge to raise and lower them so as to bore in the centre of the post. The middle hole is made first, and I put a pin 18 inches long through it, so as to have all holes in the right position. On the carriage there is a lever with a sharp pin to hold the post firm. The cost of the machine is about $15.—*Thomas Youngs.*

Self Shutting Gate.—A flanged pulley is fastened to the back top part of the gate, concentric with the hinges, as shown in the sketch, fig. 157. As the gate is opened, the pulley turns with it. Fastened to the circumference of it is a rope passing from the inside of it back horizontally, and then downward over a pulley on the fence, as shown. To the end of the rope is attached a suitable weight. As the gate is opened, the weight rises, and the pressure tending to close the gate is uniform, no matter how far it may be opened, or how nearly closed. If the pulley on the fence is farther back than shown in the sketch, or if the weight is arranged to fall on the inside of the fence instead of being as represented, the gate may be thrown entirely open, and the shutter will act just as readily, being always in line. It is cheap, simple, effective, durable, and not liable to get out of order.—*A. L. Hatch.*

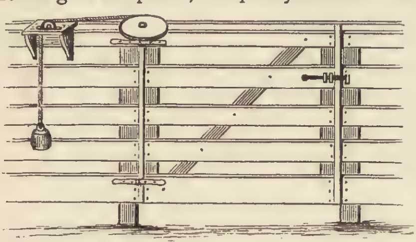


Fig. 157.—*Self-Shutting Gate.*

Raising Clover Seed.—The first requisite is to have a good field of clover, sown on clean land, and clear of weeds. This will make all the difference between clean and foul seed. Some weeds are comparatively harmless, while others may make years of work to eradicate. The next year after seeding the field to clover, let it be cut down closely about the time of its first blossoming, which at the North is about the middle of June. It may be cut for hay, or it may be pastured closely. The first mode is rather the most reliable. A second growth will spring up and bear an abundant and even crop of blossoms, which will ripen seed early in autumn. The proper season for cutting is indicated when most of the heads have become brown. There are different modes used for cutting. One is to cut

the crop with a mowing machine, raking it into quite small cocks, which are to remain a few days, the drying being assisted by occasionally turning them over, as examination may indicate. Another and more systematic way is to take a combined mowing and reaping machine, put on the platform, sharpen the knives well, and then with a good hand raker keep the cut crop on the platform until there is enough for a large bunch, when it is pushed off. At the next passing drop bunch at the same place, so as to make windrows. When partly dry, cock it, and let the drying process be completed as already described. This plan obviates raking, and leaves the crop in better condition. Draw it in on a dry day, and thresh it at the proper time with a clover huller. When a mowing machine cannot be had, the crop may be cut slowly with a scythe. If a clover huller cannot be procured, let the hay become quite ripe, and if it has been wet, it will shell the better, and resort to the more imperfect mode of threshing and passing through the fanning mill. The threshing is of course most easily and perfectly performed in sharp, frosty weather.

THE WEEDS, THE WEEDS !—Can we say anything to induce land-owners to keep their grounds cleaner ? It has been justly remarked that we are a weedy nation, and if the weeds annually raised within our boundaries were clover and wheat instead, they would amount to sixty million dollars. Probably this is too low an estimate. We are glad to observe that there is a distinct improvement in this respect, both in gardens and on farms, within a few years, throughout the country. But it is hard to make some men understand that if they can kill or eradicate half the weeds, there is no reason why they cannot root out the other half. We have been trying to teach this doctrine to one of our hired men, who seems to entertain conscientious scruples against making a clean sweep of the weeds. He seems resolved to leave at least a tenth of the whole amount, and we cannot make him understand that if the first tenth may be killed, the last tenth may be also. We once visited a nurseryman who occupied thirty-five acres, but who kept *no weeds!* "How do you manage to kill all the weeds?" was our question. "We do not kill them—we never allow them an entrance." However, in a subsequent year, which was unusually wet, we found about one dozen weeds on the whole 35 acres. Nevertheless, the doctrine is correct, that weeds may be eradicated. If one, then all the rest.

TRIMMING HEDGES.—We find the implement figured and described on page 226 of Volume IV of RURAL AFFAIRS, after many years' trial, just the thing for keeping Osage hedges in shape. An active hand trims a quarter of a mile a day, both sides, on a hedge twelve years old. Many people greatly increase the labor by doing the work when the shoots are hard and difficult to cut. We have ours trimmed every year in August, while the shoots are yet soft and green, when they yield to the hedge-trimmer like butter to a hot knife. If done at precisely the right time, (which can be determined only by experience in different localities,) they will sprout little or none, and the remaining wood will ripen and harden. If

left till spring, the work will he three-fold. Our Osage hedges which stand near or over the tile drains do not winter-kill; those which have a wet subsoil are constantly liable to winter-killing. The plant needs emphatically dry feet. We have not tried the mode of trimming here mentioned on honey locust hedges, but have no doubt that, with some modification, it would answer as well. It must be borne in mind that the Osage orange is a strong grower, and some check in growth by trimming while in leaf does no harm. The honey locust is a slower grower, and it may therefore be best to trim hedges of this tree later in tne summer.

CUTTING TIMBER.—Where a succession of growth is not desired, cut the trees at mid-summer, split or saw into posts immediately, and place them where they will dry rapidly. The great point in preserving durability, is to season quickly, before any fermentation or partial decay begins in the log. All other theories about the best time for cutting are merely fine-spun refinements. The best way to make the posts last long, is to set them in ground the subsoil of which is constantly well drained. Over an underdrain is a good place. Posts soon rot in a soil often water-soaked. A coating of hot gas tar to the part under ground is useful; or thrusting the lower ends for a few minutes into a large boiler filled with hot gas tar.

HOT-BED FRAMES AND MUSLIN.—Take white cotton cloth of close texture, and nail it to the frames; then apply with a paint brush the following mixture: Two ounces of lime-water, four ounces linseed oil, and three ounces fresh eggs. Beat the eggs separately, and add them to the oil and lime-water after the two latter have been warmed and mixed together. Successive coats should be given to the cloth until it is waterproof. The expense is said to be one-fourth that of glass. If the frames are large, cross-bars a foot apart will support the cloth.

HOW TO USE PARIS GREEN.—D. C. RICHMOND of Ohio recommends the following way of applying this virulent bug-killer, avoiding the danger of the arsenic dust flying in the air and entering the breath: A hogshead of water with a faucet, is drawn on a wagon to the potato field, as a reservoir to draw from. Fill a pail with water and stir in a heaped tablespoonful of pure Paris green, and more if impure. Dip in an old broom, and with it sprinkle the infested plants. Bright sunshine is the best time.

CARE OF LAWN MOWERS.—The Horticulturist gives five rules to keep lawn-mowers in good order, which we condense: 1. A smooth lawn, free from all stones and obstructions. 2. Frequent cutting, the grass never over four inches high. 3. Machine always well oiled and kept clean—without which, good machines have been condemned, 4. Moderate starting, to prevent breakage, especially with horse mowers. 5. A well adjusted wiper, or revolving cutter, just touching the head knife—which will obviate frequent sharpening.

ACCIDENTS AND EMERGENCIES.

WHENEVER ANY ACCIDENT OCCURS, do not stir till you know just what to do. Take things quietly—keep silent. Avoid adding to a panic in those around you. Disasters are always worse for fright and perturbation. Self possession is the first step to presence of mind, and knowing exactly what to do is of vital importance. It has sometimes happened that one quiet, self-possessed person in a crowd of a hundred has completely controlled them, and prevented their doing additional harm. Dr. Hope mentions the case of a man who accidentally cut his wrist with a piece of broken jug. Although in a large city, surrounded by doctors, he was allowed to bleed to death, and his wife to stand her trial for murder, for want of coolness, common sense and knowledge.

In another instance three boys were walking across a field, when one of them stumbled on an open knife which he held in his hand, and cut an artery in the leg. The two others were frightened and ran for assistance, and before they returned he had bled beyond recovery. If one had remained and pressed firmly on the artery, his life would have been saved. Still another instance of the loss of hundreds of lives for want of knowledge and presence of mind, occurred when the steamship Arctic was rent at the side by striking another vessel. The water poured in and she soon went down. If, as soon as the accident occurred, the water had been pumped into one boiler, and driven out of the other, it would have raised the rent above the sea, and all might have been saved.

Nothing helps one to maintain self-possession and presence of mind more than knowing what to do. Study these rules therefore and get them durably impressed on the mind, so that you may recall them on any emergency.

BURNS.—If slight, immerse the part in cold water, or put on it ice or snow. If done immediately, a continued application long enough will keep down inflammation. Or apply powdered chalk or whiting mixed with lard. If so severe as to destroy the skin, cover with varnish, or a strong solution of alum, or a mixture of lime water and sweet oil ; or if none of these are at hand, mix whiting with linseed or sweet-oil ; thin with a little honey, and apply with a soft brush or feather—every touch will give relief.

If the clothes catch fire, the first thing is to extinguish the blaze. Do not let the sufferer run about—every motion fans the flame ; but lay him quietly on the floor, and wrap closely in folds of carpet, a woolen shawl, hearth rug or woolen table cover. Then use water to put out the remaining fire. Next, remove the clothes very carefully, cutting them gently with scissors or a very sharp knife. Be careful not to injure the skin. Then shake on flour or powdered starch, to exclude air. Or apply wet cloths to reduce the redness and heat. Do not use cold water—let it be slightly warm. Lime-water and linseed oil may be applied on old linen or calico well soaked. Or the parts

may be covered with castor oil. All these are useful, but some may not be at hand. Absence of pain is a bad sign, and shows that the burn has been severe and the part destroyed. Keep away idlers, and let the patient be quiet.

If the person has sufficient presence of mind when the clothes first take fire, slide the hands down the dress as closely to the body as possible, to check the blaze ; at the same time sink on the knees. If this is not sufficient, lie down quickly and roll on the fire, and wrap yourself closely in a woolen shawl, piece of carpet or any woolen cloth which can be seized. Never continue standing a moment, and especially never run about.

HOUSES TAKING FIRE.—The first thing is to *keep all the doors shut.* Currents of flame will then be confined, and cannot sweep so rapidly through the building. Keeping the doors all shut will sometimes so retard the flames that they may be extinguished. If they cannot, it will help much towards removing the furniture. We knew a fine house that was all in flames in ten minutes, in consequence of the wild fright of the inmates, who ran frantically from one room to another, leaving all the doors open.

If the lower story is in flames, the first thing for the inmates above to do is to loosen a bed cord if possible, or to tie the bed-clothes together by secure knots, and then fasten one end to the bedstead. This will admit safe descent, and often prevent broken limbs from jumping. The quickest way to tie a secure knot, is to place two ends parallel together, (fig. 138,) and tie a common single knot near the end (fig. 139.)

Fig. 138.

Fig. 139.

Before passing through smoke, take a full breath, and then stoop low. But if the fire has been burning some time, and less smoke is present, and carbonic acid is therefore feared, walk erect.

Out-houses are sometimes set on fire by burglars, to draw attention from the dwelling. Whenever, therefore, you find an out-house burning, and suspect it was set on fire, let a strong guard examine the house.

Every room which is lighted with a kerosene lamp should have a woolen blanket, table cover, rug, shawl, or other woolen fabric, ready in the same room, so that in case of an explosion it may be instantly applied to smother the flames. Many lives would be saved every year if this were everywhere attended to. Do not use water on burning oil, as it often forms steam and spreads the oil.

To save horses from a rapidly burning stable, blindfold them, or they cannot be led out. Throwing a harness on a horse will often assist.

If the soot in a chimney takes fire, and danger is feared, first shut all

the doors and windows in the room, to lessen the draft; then stop up the chimney flue with a piece of wet carpet or blanket. If a little water or common salt is then thrown on the fire, it will reduce the flames. The draught of the chimney will be checked, and the fire will soon be extinguished for want of air.

DRIVING HORSES.—If horses become frightened and run, in all cases *keep your seat*, unless they stop so that you may jump out safely. Jumping out when moving swiftly is sure to throw you severely against obstacles. The carriage itself will protect you in many cases. If the harness breaks while you are driving up hill where there is a bank on one side and a precipice on the other, turn the horses' heads toward the bank, if you have a four-wheeled vehicle. This will cause the wheels, in backing, to turn against the bank. But if you have a two-wheeled carriage, turn the horse towards the precipice, which will run the wheels from it. Observe the same precautions if a balky horse should commence backing.

BREAKING THROUGH ICE.—The first thing to do when a person has broken through the ice, is to procure a pole or stick—if laid on the ice, it will bear considerable weight, even if the ice is thin, because the pressure is all along it, and not on one spot, and will enable the person to lay hold of it to be helped out. In one instance a young man broke in while skating; the bystanders stood afar off in terror, fearing to approach him on the thin ice, and there appeared no help for him. Suddenly a man was seen rushing towards the spot, and tearing instantly a long board from a fence on his way, he ran it on the ice towards the young man, and rescued him at once. If no pole or board can be had, stretch yourself at full length on the ice, and it will bear you up much better that standing on your feet. Many persons lose their lives under ice by slipping under the edge while endeavoring to raise themselves on their arms. It is better to approach the edge sidewise, and endeavor to roll out.

When horses break through ice, they may be drawn out more easily by bloating them, drawing a halter tightly around the neck so as to prevent breathing for a short time, and removing it as soon as they are rescued.

BLEEDING.—If an artery is cut, compress *above* the wound, or between the wound and the heart; if a vein is cut, compress *below*. ARTERIAL bleeding is known from the bright scarlet color of the blood, and from its issuing in jerks. To stop it, put your finger on the wound and press upon the bleeding aperture — this will stop the bleeding as long as the pressure, if properly applied, is continued. To maintain the pressure, tie a handkerchief twice around the limb above the injury, with a pad

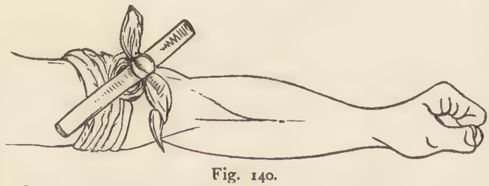


Fig. 140.

on the artery; place a stick at the knot, and turn it till the blood stops (fig. 140.) Or fold a piece of soft rag several times, put it quickly over the opening, and secure it by a piece of broad tape or bandage.

Blood from the VEINS is dark colored, and flows in a continuous stream, and not by jerks. It may be stopped by the pressure of the finger, or by a bandage. If the person shows signs of fainting, it will do no harm, as fainting tend to stop bleeding.

When internal bleeding occurs from the mouth, throat, lungs or stomach, place the patient in bed, with the head slightly raised, keep the room cool and perfectly quiet, and give a frequent swallow of ice-water, or a small lump of ice, or crushed ice, not more than a teaspoonful.

In general, one of the best things to stop bleeding from a moderate cut, is to cover it copiously with a mixture of flour and salt in equal parts. A handful of dry earth pressed on the wound and held there will stop bleeding, when the accident occurs in the field or on a railroad.

If blood flows freely from an artery, it should be stopped without a moment's delay, by hard pressure, either of a ligature or the forcible use of the thumb. Keep the pressure, without relaxing an instant, till the surgeon comes, so that the coagulating blood may glue up the wound.

Bleeding of the nose often stops itself at the right time; but if not, let the person sit upright, bathe the neck and face with cold water, and dissolve a little alum in water and squirt it up the nostrils.

Bleeding from the stomach, or vomiting blood, is not always so dangerous as it appears. Two teaspoonfuls of vinegar, with one of epsom salts, may be taken every half hour till it stops; and small quantities of cold water or bits of cracked ice are useful.

Blood from the lungs comes in smaller quantities, is coughed up, and has a brighter color. Give a teaspoonful of vinegar with one of paregoric every half hour; sponge the chest with cold water, keep the shoulders raised, and the patient quiet.

If there is much bleeding from *pulling a tooth*, fill the cavity firmly with a plug made of lint and whiting or powdered clay. Change it every fifteen minutes till the bleeding stops, and then keep it in twenty-four hours.

TREATMENT OF WOUNDS.—Do not be in a hurry; wash the wound carefully and remove all dirt, for which a sponge may be gently used. After bleeding has stopped, which may be half an hour or less, bring the edges very accurately together, placing over it a piece of linen, secured with a bandage. When the parts can be sewed together at the edges, do so, for which silk thread is best—the needle, well oiled, thrust through the skin, and each stitch secured by a knot, (fig. 141.) In a day or two the stitches may be removed by carefully cutting and drawing out. Sometimes isinglass plaster answers well to draw

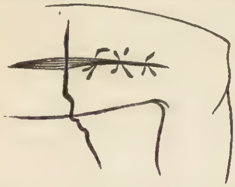


Fig. 141.

the edges together. When any part is cut clear away, replace it quickly, and keep it in its exact position by pressure.

If a fish-hook or barbed crochet-needle runs into the hand, do not try to draw it out, as that would tear the flesh; but first be very sure which side the barb is, and then push down a very smooth ivory knitting-needle, or something similar, to crowd the flesh off from the point, and then draw both out together.

When bruises occur, cover the part with a cloth dipped in cold water every few minutes. If bleeding increases, use the handkerchief and stick. Severe or large bruises, as of broken limbs, are relieved of the pain by immersing in blood-warm water.

If a bone is broken, keep the part perfectly quiet, and if the patient has to be removed, carry him on a board, door or bench, and let him be conveyed quietly by four men, and never in a carriage. More damage is sometimes done by careless moving than by the original accident. For dislocation, procure a surgeon as soon as possible.

POISONED WOUNDS.—Sometimes poison, such as dead animal matter, is introduced into a wound, causing formidable injury. Place a ligature above the wound, tight enough to promote but not stop bleeding (fig. 142.) A quill or small tube may be placed over the wound, and by sucking, the poison will ooze out into the tube.

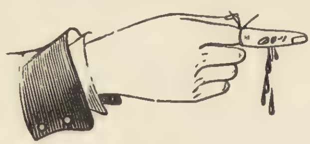


Fig. 142.

BITE OF A MAD DOG.—Cut out promptly the bitten part—or burn it out with a small red-hot iron, or with a stick of lunar caustic. Youatt was several times bitten, in his care of these animals, and always cured the bite with lunar caustic. The more thoroughly either of these remedies is applied, the better.

For SPRAINS, apply cloths wet in laudanum and hot water, and keep the part quiet. If of the wrist or ankle, it must not hang down.

If the jaw is put out of joint by opening the mouth too wide, place a stick (a small cane for instance) across the mouth like a horse's bit. Push it far back, and then press downward till the jaw slips into place.

RAILWAY ACCIDENTS.—When these occur, first clear away idlers. Keep the sufferers as quiet as possible till the surgeon arrives. Those who are slightly injured or jarred will be better to lie down and be quiet an hour or two.

CHOKING.—If choked, get on all fours and cough. If this does not answer, thrust out the tongue, or draw it forward with the finger and thumb covered with a handkerchief, and then let another person who has nerve boldly thrust the forefinger well down, and draw out the obstruction. The finger and thumb of a resolute bystander are the best instruments. Fish bones, pins, and other small, adhering substances, or anything too far down to reach, may he carried down by quickly chewing and swallowing a mass

of bread or other pulpy substance, and sometimes by copious draughts of water.

Dust or Cinders in the Eye.—Avoid rubbing—draw out the lid, and if done soon enough, the substance will work out in a few seconds. But if not, place a small stick, bodkin or knitting-needle horizontally across the outside of the lid, and invert the lid over it. This will show the object, which may be then removed with the point of a small roll of paper, or the rounded point of a lead pencil.

If *fresh lime* gets into the eye, do not use water, but employ diluted vinegar or lemon juice to neutralize it.

Bee Stings and Insect Bites.—Remove the sting if left in ; apply cold water quickly, and as soon as possible spirits of hartshorn, soda, or even wet wood-ashes, to neutralize the acid poison.

If *strong acids* come into contact with the skin, use alkaline solutions immediately to neutralize the acid, as lime-water, carbonate of soda, or magnesia—or even common soap in thick solution. Cover with linen and oil-silk or bread poultice.

For fresh *chilblains*, employ friction and soap liniment. For *frosted parts* rub with snow or very cold water, in a cold room, so that the warmth may come very gradually. Sudden heat is very destructive—the slower and more gradual, the better.

Fainting.—Place the patient flat. If he can swallow, give cold water.

Apoplexy.—The patient has pain in the head, increased by lying down. If severe, the face is purple and the breathing labored. Loosen all tight clothing about the neck and chest. Keep the neck and shoulders well raised. Do not bend the neck forward. Apply a stream of cold water to the head, but give nothing at the mouth. Apply warmth to the feet.

Sunstroke should be treated nearly as apoplexy, and ice be applied to the head.

Epilepsy.—The patient drops instantly—the face is twitched—pulse not much changed. Lay the patient on a bed, and apply a wet cloth to the head. The fit usually passes off in a few minutes.

Hysterics.—Let the patient lie on a couch, and then continue to pour cold water on the head till relieved.

Poisons.—For acid poisons give alkalies ; for alkaline poisons give acids. When poisons have been swallowed, the first thing is to induce vomiting. A teaspoonful of mustard swallowed in half a tumbler of warm water will answer.

If *arsenic* has been taken, give large quantities of milk and raw eggs, lime-water or flour and water ; then castor-oil.

For *antimony* (in tartar emetic) give plenty of strong tea of any kind.

For *strong acids*, put an ounce of calcined magnesia in a pint of water, and give two tablespoonfuls every two or three minutes. If magnesia is not at hand, use whiting, chalk, soda, or knock a piece of plaster off the wall, pound it small, and give it in milk and water to neutralize the acid.

Another person may cut soap into small pieces, and give a teaspoonful in water, or a tablespoonful of soft soap. Give plenty of warm water to drink.

For *verdigris* drink large quantities of milk and white of eggs, but no vinegar.

Sugar of lead, red lead or white lead—Put two ounces of epsom salts into a pint of water, and give a fifth part every ten minutes, till it operates freely.

Laudanum taken too largely must be removed quickly by vomiting, by giving fifteen grains of sulphate of zinc in a little water; to a young person half that quantity, and to an infant ipecac. If these cannot be had, use mustard and warm water, already mentioned, and tickle the top of the throat. After vomiting, give plenty of strong coffee, and if sinking, give alcohol and water. Keep the patient walking, and dash cold water in the face, for if he sleeps at this stage, it will be the sleep of death.

Mercury—calomel, corrosive sublimate, &c. Give white of egg in water every five minutes, with large quantities of milk and flour in water.

Iodine or its compounds.—Take large quantities of cold starch and water, or flour and water.

Phosphorus from matches.—Give large quantities of warm water with magnesia, or chalk, or whiting, or even flour—but no oil or fat.

Strychnine or nux vomica.—Give an emetic, then linseed tea or barley water.

FOR APPARENT DROWNING.—Send immediately for a doctor, blankets and dry clothing. The first thing is to restore breathing, then to promote warmth and circulation Continue the efforts at least an hour after the pulse and breathing have ceased. At the same time remove the wet clothes and add dry ones.

First place the patient gently face downward for a moment, with one of his wrists under his forehead, to clear the mouth and nostrils. The lungs are never filled with water. Remove all tight clothing about the neck and chest. Keep his tongue forward, which may be done by an elastic band over the tongue and under the chin. Then place the patient on his back, with head and shoulders raised on a firm cushion, as of a folded coat. Draw the arms, by grasping them just above the elbows, gently upwards above the head, to draw air into the lungs, and hold them two seconds; then turn them down and press them gently and firmly for two seconds against the sides of the chest, to press the air out. Keep on this way fifteen times in a minute, perseveringly, deliberately, until natural breathing is perceived, and then stop and induce circulation and warmth by steady and continued friction with handkerchiefs or flannels, under the clothes and over the whole body, and upwards on the limbs, for several hours if necessary, by relays of attendants. This propels the blood along the veins towards the heart. Mustard poultices on the chest will relieve the distress in breathing. Keep idlers away. The same remedies may be applied for suffocation from foul air, or by hanging.

NOTES ON ORNAMENTAL PLANTING.

BEAUTIFYING NEW GROUNDS.—Ornamental trees, when set out in new plantations, are commonly only a few feet high, even if they are ultimately to grow to a spread of fifty feet in diameter. If the owner gives them their full allotted space at the commencement, the surface of his grounds will remain bald and unshaded for many years. Hence it is common to set them out more thickly, with the intention of thinning out as they begin to encroach upon each other. This will answer well, provided the owner is sure he will give them the necessary thinning in time. Such kinds as maples, black walnut, chestnut, honey locust, linden, &c., if only six or seven feet high when taken from the nursery rows, may be set temporarily within ten feet of each other; and during the first six or seven years, they will not encroach upon each other; while at the same time an agreeable amount of foliage and shade will be soon afforded by them. But the difficulty is, they will be left to stand too long; and the full, rounded, natural symmetry of the heads will be likely to be seriously interfered with before thev are cut away (fig. 143.)

Fig. 143.

We advise every one, therefore, to look carefully before he sets out many trees closely together around his newly erected house. We not unfrequently see the largest kinds of both deciduous and evergreen trees set within a few feet of each other. A young Norway spruce, for example, when three feet high resembles a handsome shrub, and the trees are often set so as to appear well if they should never grow larger. The owner's seem hardly to comprehend how they are to be fifty feet high in half a short lifetime, with a spread of branches on the ground thirty or forty feet in diameter. Sometimes we see the young evergreens transplanted within a single yard of a gravel walk or a carriage drive. If they grow well, they must soon be cut down, shortened in heavily, or suffered to close up the passage before many years. It will be best, therefore, always to give ample space between the borders of roads and walks, and plantations of trees—because their forms will always be fullest and most perfectly developed nearest to such open passages, and we do not wish to spoil the best forms by cutting out, and lay open the bare stems and meagre branches of the trees beyond them.

"When shall we begin to thin out? What rule shall we adopt for it?"

Answer—if you wish your trees to grow up with perfect, rounded heads, or with rich, grand, broad-spreading branches (fig. 144,) never allow two

adjacent trees to touch each other at the extremities of their longest limbs. If you wish to have a group of two or three or more stems, (fig. 145,) supporting tops that shall form one rounded mass, they may of course be

Fig. 144.

Fig. 145.

nearer, but other trees should give this rounded mass plenty of space. The same remark applies to a belt, copse or continued mass of trees.

RAISING SLIPS.—A simple little contrivance, represented in fig. 146, is described in the COUNTRY GENTLEMAN as follows:

"A common large cigar-box may be the house. A pane of glass to cover it will make the roof. A shallow pan or two saucers of water in the bottom of the box or two inches of fresh wet moss around its roots, or both, as in sectioned figured, will furnish vapor, which the glass covering will retain, while admitting light. To prevent excess of heat in case of the sun shining full on its glass roof, a piece of white paper can be laid on as a screen, and kept secure by a piece of glass, so that light may be excluded as little as possible during the day. And if cold nights should occur, the box is easily moved to a safer position.

Fig. 146.—*Section showing three cuttings set in the sandy mould in the inner box, the pan beneath, the moss around, and the glass and paper and paper-weight above.*

"All necessary precautions are thus secured, and a crop of cuttings may be had, rooted, in a week or two, if they are taken green from the ends of the stoutest young shoots of a herbaceous plant, when just under full process of extension in growth. The lower leaves are taken off, and the cuttings immediately set in the damp, sandy soil, before they wilt in the least. They may be from one to three inches long, and the two or more leaves left on them may be clipped if very large, so as to reduce their length.

"The soil may be pure sand if merely for rooting or striking the cuttings, as the phrase is. But whatever soil is used must be sweet and fresh, taken from the *surface* where it has been long exposed to the light, the rain, and the free air. A piece of decayed sod, full of the fibrous roots, covered an inch or two deep with clean sand, will make an excellent bed, in which the young plants can feed well after they have rooted.

"On setting the cuttings in the sand, it should be once gently but

thoroughly watered. With the surroundings indicated in the figure, it is not likely to become dry; but if it should, water must be sprinkled on very gently, for the cuttings should not be suffered to flag in the least. There is such a thing as 'damping off,' which sometimes destroys cuttings; but if the soil and box are sweet and clean, the temperature favorable and steady, the water pure and tepid, and given in vapor rather than solid flow, the process of cell extension will go on within the cutting, rapid as the frothing of beer, but far too infinitesimally minute to be visible, and its extensions will soon appear in the form of new roots and new tips."

FLOWERS ON DINING TABLES.—One of the most pleasing decorations of dining tables consists of vases and bouquets of flowers. But such flowers can be kept for a short time only; and in winter, when they can be obtained only from greenhouses, the decoration is costly. We observe a contrivance in a late number of the London Garden, which obviates the difficulty, and permits the use of plants flowering in pots, in a neat and effective manner, where the table has movable leaves, like our common extension tables. We vary the contrivance a little to suit the peculiar wants of this country. A notch is cut at one side of one of the movable leaves, equidistant from the ends, and large enough to receive the stem of the plant. This notch may be in a board made for the purpose, if it is desirable not to cut the table leaf. A shelf is placed under the table to receive the pot, fig. 147, which may be blocked up so as to bring the surface of the pot near the table. The leaves of the table are then pushed together into their places. Fig. 148 represents a plant of white Bouvardia treated in this way, and neatly trimmed with ferns about it, in which a few cut flowers of scarlet geraniums and cream

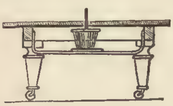


Fig. 147.

Fig. 148.—*Plants on Dinner Table.*

chrysanthemums have been placed. If cloths are used on the table, the plant will stand where two come together; but the contrivance is most easily managed when the table is not covered with a cloth.

SIMPLE HEATED PLANT CASE.—The following figure and description

of a small plant case, *warmed wholly by a lamp*, will be interesting to such as wish to raise greenhouse plants, and cannot afford or give the time to houses for the purpose. We copy it from the London Garden:

"We have much pleasure in calling attention to a plant case invented by Mr. Peter Barr, which is most effective in raising seedlings and growing plants which require a genial warmth. Our illustration (fig. 149) saves us the necessity of describing it. Below the 'fibre,' and the 'water' the section shows a hollow chamber, and below that a little stand supports a lamp, the heat from which enters the chamber and escapes through small perforations in its sides. This lamp works very well, simply requiring trimming night and morning, and replenishing with oil; the best colza oil is used. There are two patterns of this case—one rather deep, in which small stove plants, &c., may be grown; the other shallow, and more suitable for seedlings, cuttings and other dwarf subjects, which are thus brought much nearer the glass. They are manufactured in several sizes. These cases will be found very useful by persons who wish to raise seedlings or grow tender plants in a dwelling-house, or in a cool greenhouse, orchard-house, or conservatory. This is a modification of an improvement on the Waltonian case."

Fig. 149.—*Plant Case.*

CURIOUS ORCHIDS.—Alfred Smee, in his interesting work, entitled "My Garden," describes and figures some curious species of Orchis,

Fig. 150.—*Man Orchis.*

Fig. 151.—*Bee Orchis.*

Fig 152.—*Fly Orchis.*

among which is the *Orchis mascula*, or Man orchis, so called because the flower has a resemblance to a little man dangling from the plant; this is cultivated more as a curiosity than for its beauty. The Bee orchids are very beautiful, and grow with great luxuriance under proper management. A

third, less showy, is the Fly orchis. The best soil for these plants is a light turfy loam.

SELECT ROSES.—The American Rural Home gives a select list of roses, made from lists of a dozen each, furnished by seven Rochester nurserymen, which we append—most of them being hybrid perpetuals:

Gen. Washington has the suffrages of all,	7
Caroline de Sansal,	6
La Reine,	5
John Hopper,	4
Victor Verdier,	4
Gen. Jacqueminot,	4
Baronne Prevost,	4
Anne de Diesbach,	3
Madame Alfred de Rougemont,	3
Triomphe de l'Exposition,	3
Sydonie,	3
Madame Victor Verdier,	3
Madame Plantier,	3
Perpetual White,	3

WARMING SMALL GREENHOUSES.—An English journal says that a gentleman who had a small greenhouse of half-hardy, not tender plants, employed at first no heat but gas, during cold snaps. The gas, however, was found ruinous to the plants, and he substituted cheap paraffine lamps, distributed in different parts of the greenhouse, with entire success. In the colder winters of this country, the same means of softening the severity of the temperature might be adopted, provided the half hardy plants selected were sufficiently hardy to bear some cold, in smaller greenhouses or plant cases.

TRANSPLANTING EVERGREENS.—The best way, in ordinary cases, in transplanting all trees, is to select those of small size, so that the roots may be removed entire, and the trees will meet with little check by removal. But it is sometimes desirable to remove large trees. The great requisite in such cases is to shorten the roots the previous year. It makes a vast difference. A proof was given lately by Dr. Hull at a meeting of the Alton Horticultural Society. He transplanted evergreens with perfect success that were 15 years old, by root pruning the previous year.

LILIUM AURATUM.—A writer iu the Rural New-Yorker says that many bulbs of this lily have been lost by disease or decay, and that the supply has become small. He thinks a reason for this loss is too much heat in summer and a want of moisture. He recommends mulching, but more especially deeper planting, particularly in light soils. He has found that even small bulbs, planted six or eight inches deep, gave better growth than those at less depth. In heavier or clayey soils the bulbs are less affected.

DURABLE STAKES.—The Technologist has used flower stakes for more than nine years, perfectly sound, made durable by placing them in a boiling kettle of coal tar for ten minutes, then rolling all the tarred part in clean sand, and then again tarring and sanding after the first coat is perfectly dry. Our experience is that coal tar is excellent for wood constantly exposed to moisture or under ground, and bad for wood above ground, for which latter petroleum is best.

THE GREAT SALE OF THE CENTURY.

THE DISPERSION of the New-York Mills Herd of Short-Horns, the property of Hon. SAMUEL CAMPBELL, which occurred at public auction at that place, Sept. 10th, 1873, is one of those events which have no precedent in history, and are not likely to be repeated in the future. It is therefore proper that we should place on record in these volumes an outline of the occurrences of the day, revised and somewhat abridged from the columns of the COUNTRY GENTLEMAN. In the prefatory remarks we refer briefly to the most celebrated Sales in the history of the ancestors of Mr. Campbell's cattle.

It was in the year 1810 that the Short-Horn herd of CHARLES COLLING was brought to the hammer—the herd in which the unbroken lineage of the Duchesses traces back to the year 1784. Under the impulse of the Napoleonic wars, English agriculture was in a condition of great prosperity. The values of farm products then current have seldom if ever been equalled, before or since. The Short-Horns had already earned a well-won reputation throughout the kingdom. The attendance was enormous, and the prices made were extraordinary. The bull Comet sold for 1,000 guineas. One cow commanded 410 guineas, and 400 guineas was paid for another. An average of £151 18s. was made on forty-seven head.

Then came a long period of comparative inactivity, though of constant actual growth. With peace, the quantity of money put in circulation was greatly reduced. There was little spirit of competition, and less of speculation, among the farmers and breeders of England, and the competition of other countries was a long time in making itself perceptibly felt. American buyers were seen in England from time to time, and in 1834 their purchases assumed increased importance. But a few years later we encountered a period of great financial depression in this country. It was not until 1850 that the recovery from its effects had so far reached the agricultural community as to result in a general and decided spirit of enterprise.

In that year occurred the sale of THOMAS BATES, conducted by the executors of his estate. Col. L. G. MORRIS, who from that day to this, has seldom been missed on great occasions of the kind, wrote us as follows, under date of Kirklevington, May 10th, 1850: "The great Bates sale took place yesterday. The attendance was from three to five thousand, from almost all parts of the world. The average price was about 63 guineas, the highest price 205, and the lowest priced sound animal 30 guineas. * * I purchased three head, and Mr. Becar of Smithtown, Long-Island, purchased four head." Among these seven were three Oxfords—the founders of their family in America, to some of whose descendants we shall refer below.

The prosperity of 1850, both in England and America, showed a rapid increase in succeeding years. In 1853 we imported largely of Short-Horn blood. A company in Madison county, Ohio, brought over twenty-three head of valuable animals. A Kentucky company sent out Messrs. Dudley, Garrard and Van Meter, who selected with care twenty-five of the best cattle they could buy. The lamented R. A. ALEXANDER of Kentucky, imported as many more, purchased without regard to price. For two of them,

Duchess of Athol and 2d Duke of Athol, he paid £525, which was considered very large. Mr. JONATHAN THORNE of New-York, eager to devote some part of his large wealth to purposes which would have a beneficial influence upon the substantial prosperity of the country, had already made some purchases of Short-Horns in England, but, with the sagacity of a a shrewd merchant, he saw that the only way to render the amount invested of the greatest ultimate value, and at the same time to assure his own position at the head of the movement, was by tempting English breeders to part with what as a rule they refused to sell—in other words, by carefully ascertaining where the best was to be obtained, and then by buying it if possible.* In this spirit his son, Mr. SAM. THORNE, and the late F. M. ROTCH, who were acting for him in England, attended the sale of Lord Ducie's herd. Col. Morris was also present. The contest between home and foreign bidders was very animated, and ended in the Americans carrying off all the Duchess cows of the herd which were considered certain breeders—Col. Morris for himself and Mr. Becar, buying Duchess 66th at 700 guineas, and Duke of Glo'ster for 650 guineas, while Mr. Thorne obtained Duchess 64th for 600 gs., 59th for 350 gs., and 68th (lost at sea on the passage) for 300 gs. The general average of the sixty-two head sold on this occasion was over £150—the 13 bulls averaging £191 18s., and 49 cows £140 2s.

We advert to the foregoing facts in preface to our notes of the great international contest at New-York Mills, that it may be more clearly seen what sort of comparison it bears to previous events of a similar kind, and also that we may reach some explanation, if possible, of the reason why thousands were bid as readily on this last occasion as hundreds had been at an interval of only twenty years before. That the Short-Horns had established themselves at the head of all breeds, and the Duchesses at the head of all the various families of the Short-Horns, was evident enough in 1853; and, without pausing to inquire the reasons of their pre-eminence, or whether it be matter of sober judgment or popular fancy, the fact is one which candid admirers of other families or breeds cannot dispute. From 1853 to the beginning of our civil war, they constantly grew in demand and increased in value. The war, of course, unsettled everything, and our leading breeders began to turn to England for a market, as there was none at home. They were at first received with some distrust, but exportations were made by Mr. Thorne, and subsequently by Messrs. Cornell of Ithaca, and Alexander of Kentucky, and these gave good satisfaction. Mr. Sheldon's shipments at a later date excited warm interest, and Mr. Campbell, as well as Mr. Cochrane of Canada, have since found regular customers on the other side. Meantime the Duchess family had not increased in numbers in proportion to the demand, either here or in Great Britain. And when it was announced that Mr. CAMPBELL's herd would be sold, it was easy to see that England and America would enter into an unprecedented

* Mr. THORNE's agent, in effecting the purchases of 1853, the late Col. Rotch, after a protracted interview with Mr. Bolden, then a breeder of great prominence, ventured to ask him if he would sell the bull Grand Duke (10,284) at any price. Mr. Bolden's answer was a negative, although he added that if any one was so infatuated as to tender the sum obtained for Comet, he did not know that he would refuse it. Col. Rotch at once made the offer. Mr. Bolden said that as he had referred to Comet's price, though without any desire or expectation of getting it, he would accept the thousand guineas for the bull, and a draft for the amount was immediately placed in his hands. A few days later he requested the privilege of returning the draft and retaining the animal, but Col. R. replied that he had already apprised Mr. Thorne of the purchase, and he therefore had no power to recede.

struggle—the one to regain what perhaps, with due regard to her own interests, she never should have sold,—the other to retain what she had only won by expense so lavish as at the time to have been thought absurd!

The hotels at Utica had been thronged for several days previous to the Sale, with guests engaged in close examination of the Herd—Kentucky exceeding any other State in the numbers of her delegation, though there were many leading breeders from various parts of the West, some from Canada, and eight or ten from Great Britain. In conversation the previous evening, we were told that the Duchesses would go very high—up to $20,000—perhaps to $25,000! The last was the utmost limit, and we thought it utterly improbable, we confess. This incredulity was shared by others, and even the largest estimates fell far behind the actual result.

On Wednesday morning, every one's first business was to get to the scene of action. Lunch was served without waiting for noon,and indeed it was fairly over soon after mid-day had passed. The remarkable spectacle was witnessed of everything in readiness—audience and actors included—full fifty minutes before the appointed time. In justice to others who might be on the way, it was of course impossible to anticipate the advertised hour, and the delay was occupied by busy consultations or casual conversations between those who met. There were probably about one thousand persons on the ground, but there had been little notice of the Sale in the neighborhood, and few were present from merely idle curiosity. We have never seen so large a gathering of the leading breeders of the country, and doubt if another such will soon be seen again.

The order of the Sale had been fully determined on Tuesday, after an opportunity of consulting the wishes of bidders. The DUCHESSES, headed by the bull 2d Duke of Oneida, were to be taken first, the OXFORDS to follow, and then, in their respective groups, the members of the various other families in the herd. Around the stand of Mr. PAGE, the auctioneer, the press was liberally represented. A bank of seats had been erected opposite, and we noted in a central group the earnest faces of Messrs. Morris, King, Griswold, Parks, Murray and Christie, flanked on either side by a noble band of Kentuckians, seated or standing, stalwart and determined,—while away to the left, on the ring side or within it, were grouped the pleasant looking company from over-sea—Lord Skelmersdale and Mr. Holford in person,—Mr. Berwick acting for Lords Dunmore and Bective, —Mr. Richardson, agent of Sir Curtis Lampson, and Mr. Kello who carried off the great prize, later in the day, for Mr. Pavin Davies, in the fertile Vale of Severn. Not far from the English group were some of their most determined foes, the representatives of Mr. Alexander of Kentucky—himself detained at home, to the regret of all. Nearly opposite, on the right, stood the Cornells, father and son, Thorne, Wing, Harison, and a bevy of other New-Yorkers, with Mr. Conger here and there among them. The crowd pressed on every side, finally working in upon the ring until there was barely a circle vacant beneath the rostrum for the slow procession of the subjects of the Sale. The stand of seats was full to the ends, but only the central circle kept to the planks, for the first quiet bid from England brought every man to his feet but those who sat that they might not intercept the view of others.

At one o'clock, after a word of explanation from the auctioneer as to the programme of the offerings, the 2d Duke of Oneida entered, and the half-hour that succeeded—or indeed the full five hours—cannot soon be forgotten. "Will any one make me an offer for the bull?" asked Mr. PAGE.

"Ten thousand dollars," answered Lord Skelmersdale, in the most off-hand manner possible, but so clearly that no one lost the bid. We did not take the time, but should say that within 90 seconds, "eleven thousand," "eleven-five," and "twelve" were called, and on the pause that followed the last, the "one—two—three—*gone*," from the rostrum, carried the ownership of the 2d Duke to the first purchaser of the day, Mr. T. J. MEGIBBEN of Kentucky. The 1st Duchess of Oneida followed at once; she was promptly started by A. W. GRISWOLD, Esq., of New-York and Malvern Farms, Morrisville, Vt., at $15,000—a bid which at once dissipated all hopes or combinations, if such there were, to control results or figures. In quick succession the bids ran 16, 18, 19, 20, 21, 30, 30,100, and then by hundreds to the last, and she went to Lord Skelmersdale at $30,600!—an announcement followed by hearty cheers and great sensation. Then came 7th Duchess of Oneida, a yearling, and Kentucky took her innings as she fell to Mr. Alexander. She was started at $5,000, and the bids were 6, 7, 9; 10 from two parties at once; 11, 12 and a little pause; then a renewed start and quick run by five hundred or a thousand at a time, to the end at $19,000!

We can scarcely follow the eleven Duchesses, one by one, in and out of the constantly narrowing ring, though neither lingered under the eyes of the excited throng. The 10th of Geneva went by bounds of $5,000 at a bid from five to twenty-five; the next bid was 26, then 30, 30,100, 31, 31,100, 31,500, 32, 33, 33,500, 34, 34½, 34,600, and at $35,000 she went to Mr. Berwick, as was understood, for the Earl of Bective. The 8th Duchess went with her companion to the same bidder for $15,300; the 13th Duchess of Thorndale to Hon. A. B. Conger for $15,000. The 4th of Oneida then came in, and her youth and beauty went to the Kentucky heart, and Messrs. Bedford and Megibben joined forces against all comers, and carried the day at a round $25,000 offer—"it's so much easier for the reporters," said Mr. Page, "to make it even money." Next followed brief but animated work with 8th Duchess of Geneva, which once again called every man to his feet with eager cheers—$10,000, 15, 25, 30, 31, 40, were the rapidly succeeding bids, and then by hundreds to the enormous sum of $40,600, at which the "Gone" was sounded to the agent of Mr. DAVIES! And these bids often came from more than one; we know of at least two at $25,000—one of them a New-Yorker—and we fancy that both Kentucky and the far West kept in till near the end, while rumor has it that only the last one hundred quelled the spirits of the Blue-Grass State. On the next lot, she returned to the charge, and the 10th of Oneida went to Woodburn Farm at $27,000—though only an April calf! When the 15th of Oneida was reached, for whom no certain voucher as a breeder could be given, Mr. CAMPBELL requested consent for her withdrawal, which was most cheerfully and unanimously granted. The 5th Duchess had died from an accident since the Catalogue appeared. The result of the twelve great lots of the day may be summarized as follows:

TO ENGLISH BREEDERS.

1st	Duchess of	Oneida, Lord Skelmersdale,	$30,600
10th	do.	Geneva, Lord Bective,	35,000
8th	do.	Oneida, do.	15,300
8th	do.	Geneva, Mr. Davies,	40,600
9th	do.	Oneida, Lord Bective,	10,000
3d	do.	Oneida, Mr. Holford,	15,600

Average on the Six, $24,517—Total, $147,100

TO AMERICAN PURCHASERS.

2d	Duke of Oneida, Mr. Megibben,		$12,000
7th	Duchess of Oneida, Mr. Alexander,		19,000
13th	do.	Thorndale, Mr. Conger,	15,000
4th	do.	Oneida, Bedford & Megibben,	25,000
10th	do.	Oneida, Mr. Alexander,	27,000
12th	do.	Thorndale, Mr. Conger,	5,700

Average on the Six, $17,283—Total, ...$103,700

Average on the Twelve, **$20,900**—Total, **$250,800.**

The prices made for the Oxfords, though on an ordinary occasion they would have seemed high, are so dwarfed in comparison with what had preceded, that we need not make them the subject of special comment. But the whole remainder of the Sale was as remarkable in many respects, as its commencement. Not a single lot was passed. Mr. PAGE, whose advice from the beginning had been as valuable as his services were skillful, prompt and energetic throughout, had scarcely time to call attention to the merits of any single animal as it passed before him. Such bidding could only have come from careful previous examination of the herd. It had been doubted whether the Sale could be concluded in a single afternoon ; but before six o'clock the end was reached,—one hundred and eight lots having found eager buyers in less than 300 minutes, and the final aggregate of over $380,000 was passed from mouth to mouth as the company dispersed, with the feeling that the whole had been the dream of a midsummer hour, rather than the solid reality of cooler autumn calculation.

As to the prices paid for the Duchesses, a few words will be expected by our readers. The other prices, although somewhat higher than those ever before obtained at a Sale of the kind in this country, are not higher than might have been fairly prognosticated from the remarkable Sales of the preceding summer in Kentucky and at the West. As to the Duchesses, they have not before been publicly sold since the dispersion of Lord Ducie's herd, to which we have already adverted. Private transactions are reputed to have doubled their values again and again ; and at recent Sales abroad, animals having more or less of the blood, of American descent, have uniformly commanded extreme prices. What price can be afforded for a breeding animal, is generally determined by two considerations, one of which is what the purchaser hopes to gain from its descendants, and the other, what he fears to lose if it and its descendants go into the hands of his competitors. It may easily be seen that the position of England as the headquarters of the Short-Horn blood most widely sought for, is not one which she would willingly sacrifice, and she must in fact stand second to the United States, when the current of the heaviest transactions turns, as it has done of late, carrying money to the New World instead of to the Old. Mr. Bolden, as we have mentioned in the reminiscence of twenty years ago, already noted, soon began to doubt if it was not greater folly for him to take, than for Mr. Thorne to offer, a thousand guineas for Grand Duke ; and though this sum, even with due allowance for the difference of values at the two periods, is now thrown into insignificance, there is a certain basis of reason in the competition of September 10th which cannot be ignored. It may be said that there were probably arguments as sound for the payment of 13,000 florins for a single tulip bulb in 1637. Admitting that, and all that it implies, it may at least be added that the improvement of a breed of cattle, so as to produce a larger quantity of human food, in a shorter time, and at a greater economy to the

producer, is a far different object to be held in view, from the gratification of a mere fancy; and that if men of wealth are led to extremes in the patronage they extend to such an effort, there are other ways of money-spending in which they might indulge, which even the most conservative would consider equally prodigal, without the recommendation of equal purity of intention.

We give below a table showing the prices made for some of the other leading animals of the Herd, in the order of the localities of buyers:

	Price.	
GREAT BRITAIN.		
Duchesses, already mentioned, six head,	$147,100	
12th Lady of Oxford, Mr. Holford,	7,000	
Atlantic Gwynne, Lord Skelmersdale,	2,000	
Lady Worcester 4th, Mr. Holford,	3,000	
Lady Worcester 5th, do.	3,100	
Ten head, averaging $16,220—Total,		$162,200
KENTUCKY.		
Duchesses, already mentioned, four head,	$83,000	
3d Maid of Oxford, Messrs. Warnock & Megibben,	1,000	
Lady Knightley 2d, E. K. Thomas,	3,100	
Lady Bates 4th, Edwin G. Bedford,	3,250	
Lady Bates 5th, Geo. M. Bedford,	1,100	
Lady Bates 6th, do. do.	2,300	
Cherry Constance 2d, T. J. Megibben,	1,725	
Baron Oxford's Beauty, Bush & Hampton,	1,500	
Other purchases, eighteen head,	11,670	
Twenty-nine head, averaging $3,781—Total,		108,645
NEW-YORK.		
Duchesses—13th of Thorndale, Hon. A. B. Conger,*	$15,000	
12th Duchess of Thorndale, do. do.	5,700	
4th Duke of Oneida, Hon. A. B. Cornell,	7,600	
3d Countess of Oxford, Mr. Conger,*	9,100	
12th Maid of Oxford, Col. L. G. Morris,	6,000	
10th Earl of Oxford, Mr. Cornell,	2,500	
Lady Knightley 3d, Col. Morris,	5,000	
Brenda, do.	2,500	
Berlinda, do.	2,300	
Lady Bates 7th, Mr. Cornell,	1,600	
Other purchases, twenty-three head,	11,530	
Thirty-three head, averaging $2,086—Total,		68,830
VERMONT.		
7th Duke of Oneida, A. W. Griswold, Esq.,	$4,000	
2d Countess of Oxford,* do.	2,100	
2d Maid of Oxford, do.	6,000	
Lady Knightley 4th, do.	4,000	
Other purchases, seven head,	6,570	
Eleven head, averaging $2,061—Total,		22,670
Minnesota.—Seven head, purchased by Col. W. S. King, including Peri 4th for $1,700, Miss Gwynne for $1,700, and the calf Lady Bates 8th for $1,600,		8,800
Illinois.—Ten head, including Rosamond 10th, to W. R. Duncan, for $2,050,		5,295
Canada.—Five head, including 6th Lord Oxford, to Simon Beattie, for $1,300,		3,775
One animal each to Ohio, Pennsylvania, Michigan and Virginia,		1,775
Total **109** animals, average, **$3,504.50,**		**$381,990**

* These three animals, 13th Duchess of Thorndale, 3d Countess of Oxford and 2d Countess of Oxford, were purchased the next day by Col. L. G. Morris at a very handsome advance upon the prices paid by the buyers as here noted.

Taking the sexes separately, 92 cows and heifers sold for \$350,775, being an average for each of \$3,813 ; and 17 bulls and bull calves for \$31,215, being an average for each of \$1,836. It is interesting to remark, moreover, that if we throw out of account the Duchesses and Oxfords, the average on the remainder of the herd will still somewhat exceed that of any previous Sale of the kind ever held in the United States, as shown in the following figures :

SUMMARY WITHOUT THE DUCHESSES AND OXFORDS.

73 cows and heifers, average	\$1,095.00—Total,	\$79,925
12 bulls and b. calves do.	318.00 do.	3,815
85 head, average	\$985.17—Total,	\$83,740

We conclude by giving a few of the highest averages ever made at Public Sales in Great Britain, for purposes of comparison with the foregoing figures :

Owner.	*Date.*	*No. Sold.*	*General Average.*
Duke of Devonshire,	Sept. 6, 1871,	43	£240 18s. 9d.
Earl of Dunmore,	Sept. 5, 1872,	54	242 18 9
Harward and Downing,	Sept. 18, 1872,	61	253 7 0
Lord Penrhyn,	May 8, 1873,	41	210 15 4
Mr. Cheney,	July 10, 1873,	35	294 10 2

There are no other Sales on record approaching the five above mentioned in the prices made, and the highest average of them all is *less* than half the average made at Mr. CAMPBELL'S, after large allowance for difference between gold and currency. The highest single price ever obtained at public sale in England was 1650 guineas for the bull Duke of Geneva, belonging to Harward and Downing. And we may add that the high prices at all the above sales were largely, if not principally, due to the blood of American-bred Short-Horns infused in the several herds.

Perhaps to trace the history and nomenclature of the Duchess family in this country more connectedly, we should add that the importations of Mr. BECAR of Long-Island, on the death of that gentleman in 1856, passed into the hands of Col. L. G. MORRIS of Fordham, by whom, together with his own, they were sold to Mr. SAMUEL THORNE in 1857. Mr. Thorne thus concentrated in his own herd the entire importations of his father, together with those of Messrs. Becar and Morris, singly and in partnership; and the calves of the family were named Duchesses and Dukes *of Thorndale*, in arithmetical succession, while they remained in his possession.

Mr. JAS. O. SHELDON, who had lately purchased the rich and beautiful "White Springs Farm," Geneva, was at this time engaged in forming a first-class Short-Horn herd; and its progress in his hands, which we have not space to follow in detail, demonstrated so satisfactorily the unusual adaptedness of the location for breeding purposes, under his judicious management, that he was glad after upwards of ten years' experience in breeding, to avail himself of Mr. Thorne's disposition to retire from the field, and the purchase by him of the entire Thorndale herd took place in 1867. While in Mr. Sheldon's hands the descendants of the family under consideration, were named Duchesses and Dukes *of Geneva*.

Subsequently, first one-half of the Geneva Herd in 1869, and then the other, the succeeding year, was sold to Mr. CAMPBELL, and the Duchesses and Dukes *of Oneida* began to be placed on record. Mr. Campbell's resolution of withdrawal was reluctantly reached, and we believe we may safely say, notwithstanding the unprecedented prices attained, that the parting with the Herd was a sore trial to the warm heart of its owner.

THE

ILLUSTRATED ANNUAL REGISTER

OF

RURAL AFFAIRS.

THE CIRCLE OF FRUITS.

THE QUESTION IS OFTEN ASKED—"Can we have fresh **fruit** upon our tables every day of the year?" All that is required is attention and good management. The object is worth all the labor and pains required for it. A dish of fine, blushing, delicious fruit to place before a friend, or for the repast of one's family, is at any time a most acceptable offering. To continue this delicious supply for weeks, through the abundant fruit season, would be an ample reward for much toil. But a supply the whole year round, through winter and spring as well as in summer and autumn, is more than is generally expected, but is not as difficult as many suppose. The whole YEARLY CIRCLE OF FRESH FRUITS is what every land-owner or head of a family should aim for, and is the subject of our present remarks.

Good **fruit** is admitted to be eminently worthy of the labor required to

secure it. But even this labor is delight. Propagation, planting, pruning and culture,—watching the swelling green buds in spring, the bursting and opening of blossoms, the growth and development into blushing and bloom-dusted fruit—are a constant charm to the owner who spends a portion of his hours among trees. The fruit itself has many rewards. It increases the attractions of home, and thus promotes refinement and home pleasures. It adds greatly to the variety as well as excellence of household supplies. A moderate and regular use of well-ripened fruit promotes health, and settlers in new countries rarely suffer from prevailing maladies when a constant supply is afforded them. It requires but little reasoning to convince any one of its attractions and value, and our chief object at present is to point out the way for obtaining the yearly circle.

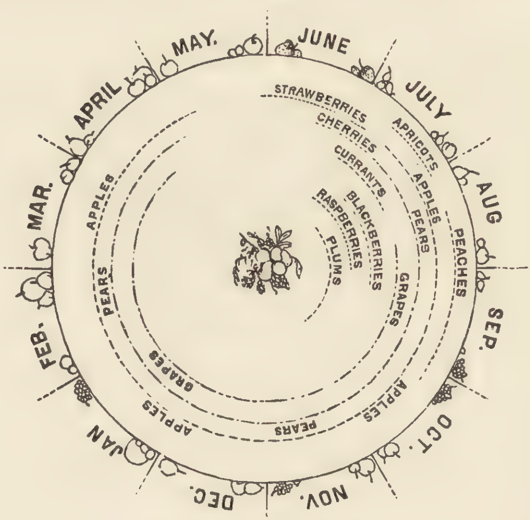


Fig. 2.—*The Circle of Fruits.*

Our earliest fruits in the Northern States, and for open air culture, are Strawberries. The earliest ripen in the neighborhood of New-York city soon after the first of June, and about a day earlier for each ten or fifteen miles towards the south, and a day later for the same number of miles going north. Of all fruits, strawberries may be most quickly obtained from new plantings; and, by forming beds, early in spring, of blocks of plants from matted beds, like pieces of turf, we have obtained fair supplies of ripe berries six weeks from planting. Under the usual modes of management, we have good crops the second year. Following strawberries, currants and raspberries ripen abundantly before mid-summer. Apricots, the

early pears and early apples follow closely in succession, with the new large blackberries and early peaches and plums before the close of summer. Then follows a thronging multitude of the many delicious autumn pears, peaches, plums, grapes and apples—with the later sorts towards winter. The supply is easily kept up through the winter months by pears, apples and grapes—the great requisites being, abundant, well gathered crops, and good fruit rooms to keep them in. A few late winter pears may be kept into spring, and with skill and suitable apartments, fresh grapes; but the chief reliance until strawberries again appear, must be in our best long-keeping apples, which, in well ordered fruit rooms, may be easily kept fine and fresh till the first of summer.

Site for a Fruit Garden.

The best localities for fruits generally, in the Northern States, are near the margins of deep or unfreezing bodies of water, which soften the severity of cold in winter, and equalize the heat in summer. The south borders of lakes Ontario and Erie, and the eastern shore of Lake Michigan, and the regions along the Delaware and Chesapeake bays, are celebrated for their fine orchards. Some smaller lakes, where deep enough to prevent freezing, afford good sites for fruit gardens on their banks.

Next to the bodies of open water, hills or elevated grounds, away from sheltered warm valleys, are the best localities. In low valleys fruit is often destroyed by frosts, while it escapes on hillsides. On still nights the cold air settles at the bottom, and the thermometer will show at such times a colder temperature than at more elevated places—(fig. 3.) Besides the effect of this increased cold, the richer soil and warmer exposure keeps up the succulent growth of the trees later in autumn, the wood ripens more imperfectly, and is less hardy, and more easily winter-killed.

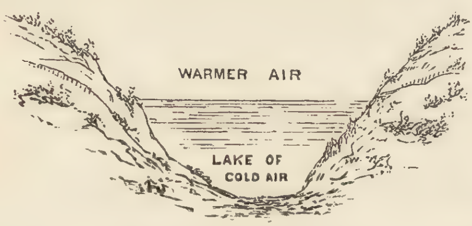


Fig. 3.—*Cold Air in Valleys.*

There are, however, other influences which modify the general rules we have just laid down. Trees growing on a compact, dry soil will be less injured by winter than those standing on moist or mucky ground. A dry, gravelly valley may therefore, in some extreme cases, be better than upland wet with cold springs. Experience must settle the question.

A good underdrainage is important in an orchard or fruit garden, and if the subsoil is not naturally porous enough to carry off surplus water, it must be thoroughly and deeply tile drained.

Fertility—Manuring.

The soil for fruit trees should be sufficiently rich to impart to them a vigorous, healthy growth. Land that will raise good corn and potatoes will answer well for trees if they are kept cultivated. If grass is allowed to grow among them, it should be richer. An examination of the trees after they are planted and growing, will show what additional treatment is required. Young trees should make an annual growth, for several years, of at least two or three feet, after they become established. But the length of the shoot should not be the sole guide; as a moderate, late and succulent growth may be more objectionable than a larger and earlier one that becomes well ripened or hardened before cold weather. If the growth is much slower than above mentioned, the whole surface should be more constantly subjected to clean and mellow cultivation, or a broadcast top-dressing of manure, or both. If, on the other hand, the growth is already too rapid, so that the wood does not ripen well, or is liable to winter-killing, or the trees fail to bear as they become older, the growth may be retarded, the wood ripened, and fruit buds formed, by seeding down to grass.

Applying Manure.—Common yard or stable manure answers an excellent purpose if spread in autumn, rains and melting snows carrying the soluble parts into the soil before the commencement of growth in spring. The quantity applied must vary with the requirements of the case, from half a dozen to twenty loads per acre. It should be evenly spread, broadcast, or over the whole surface, unless the trees are quite small. It must be constantly borne in mind that the roots of trees usually extend as far every way from the base of the stem into the soil, as the height of the trees, and often much more. A tree ten feet high stands at the centre of a circle of netted and branching roots twenty feet or more in diameter. A small circle at the bottom of the tree does very little good, as the thousands of fibrous feeders many feet away from it in every direction cannot get at the manure. It is like giving drink to a thirsty man by pouring water into his boots. Fig. 4 represents the spread of the roots of a tree to a distance equal to or greater than its height, and fig. 5 shows how small a portion of these roots are benefitted when a circle is manured or cultivated near the base of the trunk.

Fig. 4.—*Extension of the Roots of Trees.*

In addition to yard manure, a thin dressing of lime or wood ashes, especially the latter, is very useful to orchards, although their results vary on different soils, and actual experiment is the best test of their value.

We have never seen ashes applied without some benefit, and sometimes the improvement has been decided. The quantity of unleached ashes may be forty or fifty bushels per acre; if leached, two or three times as much; and fifty or a hundred bushels of lime. It is important that these materials be finely pulverized, so as to be evenly spread; in lumps they are of little use.

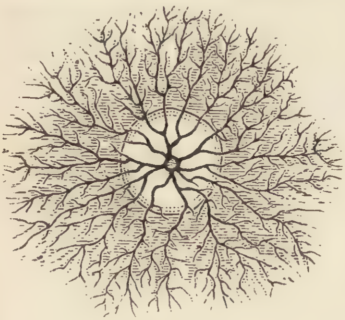


Fig. 5.

In many parts of the country, where a well drained and well cultivated soil has grown good farm crops, or where a garden soil has been kept in good order, very little additional preparation will be necessary, and the manuring or ashes may be reserved for subsequent years.

Procuring the Trees.

Planters must use their discretion in obtaining trees for new grounds. Some live so near reliable nurseries that they can visit these nurseries and make their own selections. Others will prefer sending their orders by mail, the trees to be shipped by freight lines or by express. Skillful nurserymen always pack so that trees may go a thousand miles or more without detriment, and they are taken out of the damp moss in which the roots are encased, as fresh as the hour they were dug from the ground. Others again, to save trouble, hand their orders to traveling agents, who will deliver the trees. In this case, to avoid imposition, see that the agents have fresh credentials from a well known and reliable nursery, and it is always best to deal with one, if possible, who is personally known, and who may have established his character in previous years in the neighborhood. An irresponsible tree peddler should of course be avoided, especially if he claims to have some new sorts better than the old standard ones, and at higher prices.

From bad packing, or from accident or long delay, trees are sometimes received in an injured condition; but by proper management they may generally be restored. When delayed in autumn till the roots are frozen, they will not be likely to suffer if the roots have been compactly encased in plenty of damp moss until thawed again, or if, when received frozen, they are at once buried in mellow soil, carefully filling up all interstices, so that they may thaw in the soil. Settling the earth among the interstices by pouring in cold water will be useful. If when much frozen they thaw out while exposed to the air, they will not probably survive.

If the roots and trees have become too dry and shrivelled, as sometimes

happens late in spring, they should be at once buried, roots and tops, in mellow soil, for a few days or weeks, or until they gradually absorb moisture and become plump. If the soil in which they are buried is too wet, they will absorb moisture too fast, and become water-soaked and spoiled. It is well to cut off the bruised portions of the roots, and to shorten back part way all the annual shoots before burying.

Home-Raised Trees—Amateur Nurseries.

There are many planters who cannot give the attention required for raising the young trees for new plantations, and these will always purchase of the large nurseries. Others not only can spare the time and labor, but they become positively interested, and derive much pleasure from planting, cultivating, budding and grafting young trees, and the practice acquired in managing these small plantings, gives them some additional skill in selecting from large nurseries, and in managing orchards of bearing fruits. To such persons as these, a few pages of hints and practical directions may be acceptable.

Soil for Nurseries.—A good soil is more important for a nursery, whether small or large, than for any other purpose. There is too much labor expended on a small space to waste it on poor land. Ten thousand good trees may be raised on an acre of the right kind of ground, and the trees will be worth from one to two thousand dollars. But if the soil is wet or sterile, or otherwise unfit, there may not be a hundred good trees in the whole—ninety-nine hundredths may be poor, crooked or stunted. It would therefore be better to pay a hundred dollars annually for the rent of the best ground, than to obtain poor land for nothing.

A rich, well-drained, medium loam is best for a general nursery. A light or sandy soil will raise peach and cherry trees, and often apples, but a stronger one is required for pears and plums. But even a clayey soil, if thoroughly drained, well worked, and properly enriched, will usually grow all these to advantage, and better than a light sand. The ground should be quite free from stones, as these would add greatly to the labor of cultivating and digging the trees. Nothing is better than an old pasture, if thoroughly plowed and made clean and mellow the previous year. Or if the soil of the pasture is deep and rich, it may be turned over early in the spring and put in good order at one operation, by inverting the sod with a large double Michigan plow. A similar operation may be performed with a spade and hand labor if but a few trees are to be planted. If not rich enough without manuring, the manure should be applied a year or two previously, and well worked in by cultivation; or if it consists of good, thoroughly rotted compost, it may be applied the previous autumn, or even early in the spring before planting. Forty or fifty bushels of unleached wood ashes per acre, or two or three times as much leached, will be likely to have an excellent effect. These may be spread and harrowed

in, or mixed with the compost at the rate of a tenth or twentieth part of its bulk.

Laying Out.—The rows may be about four feet apart, and vacant strips twelve feet wide may be left at each end, for the horse to turn upon in cultivating.

Seedlings and Stocks.—For a small home nursery it will usually be most convenient to purchase the one-year seedlings of dealers; otherwise they may be raised in seed-beds. In raising seedlings it should be borne in mind that the seeds should be sound and fresh, and from the best growing sorts for vigor. If they are dry or shrivelled, they will not grow. Apple and pear seed, when taken from the pomace or fruit, should be mixed with damp sand, and planted either in autumn or early in spring. If in autumn, the drills should be covered with a sprinkling of old manure, to prevent the surface crusting before they come up, and to increase their growth. Cherry stones should be similarly kept, for if they dry for only a few weeks, they will not grow. The same effect will take place with plum stones, except that they remain dry longer without injury. Peach stones kept fresh will succeed better than old and dry ones, and all seed of stone fruit will germinate better if previously subjected to freezing and thawing. Peach and plum stones grow at once if cracked open at planting, taking special pains not to allow them to dry a moment after cracking.

Depth for Planting.—As a general rule, seeds should not be buried to a depth of more than five times their diameter. Apple and pear seed should be covered nearly an inch, and peach stones nearly two inches. It is important to have a dry, rich soil to receive all the seeds, so that they may be planted before sprouting, or as soon as the frost is out of the ground in spring. Many novices fail because they leave the work till the seeds sprout, or become too dry, or till the soil is too hard and dry to impart to them the needed moisture. Do not plant the seedlings too thickly, or they will be crowded and small—never nearer than an inch or two apart. Keep the soil perfectly clean and the surface mellow through the growing season.

On the approach of winter, the apple seedlings may be taken up and secured in damp moss or sand in the cellar, for winter root-grafting; or they may be left, with other seedlings, in the ground till early spring, when they are to be set out in the nursery rows.

Setting Out.—Those which have a single tap-root may be rapidly set out with a dibble, (fig. 6,) by first stretching a cord for each row, and then thrusting the tool into the deep mellow earth to a depth a little greater than the length of the root (the point of which, if previously too long, is clipped with a knife); the root is inserted, and a few thrusts of the tool into the soil fills the hole and presses the earth against the plant. No cavities or insterstices are, as in fig. 7, to be left at the lower part of the hole, but all must be compactly filled (fig. 8) or the roots will be likely to dry and the plants to perish. If the roots are much branching, they cannot

be well set out in this way, but a spade must be used for the planting, one man holding each successive seedling by hand against the stretched line, while another man covers the roots with the spade, moving backwards along the row. The cultivation must continue through the sea-

Fig. 6.

Fig. 7.

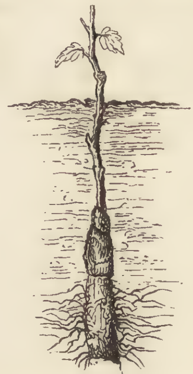


Fig. 8.

son, keeping the rows perfectly clear of weeds and the surface mellow, using the hand-hoe when necessary.

BUDDING AND GRAFTING.—Every owner of land should understand budding and grafting, not only for raising young trees in the nursery, but for replacing the tops of any undesirable sorts he may have, or to preserve or grow any better sorts newly obtained. A few brief directions may be of use, even to those who already understand something of these processes.

Budding is performed in summer,

Fig. 10. Fig. 9.

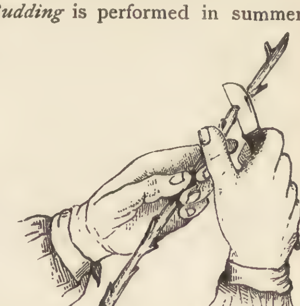


Fig. 11.

when the bark of the stock will peel or lift from the wood freely, and the

stock must therefore be in a state of vigorous growth. Any person possessing a moderate share of skill may learn to do it in a few minutes. The requisites for success are—1st, and most important, a thrifty stock; 2d, a sufficiently matured bud of the present year's growth; 3d, a smooth face made by shaving off this bud from the shoot, and inserting it smoothly and flatly under the lifted bark of the stock; and 4th, a ligature to hold it there a week or two, till the face of the bud and the face of the new wood of the stock have become firmly glued together. The next spring the stock

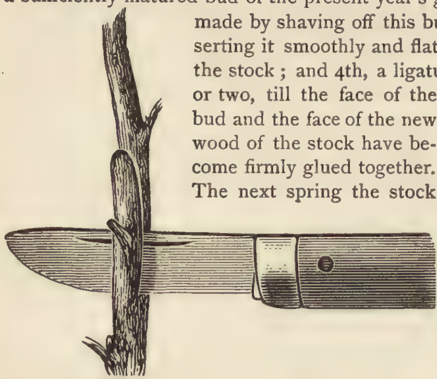


Fig. 12.

Fig. 14.

Fig. 13.

above the inserted bud is cut off, and the bud sends up a new shoot. The accompanying figures will serve to make the whole operation plain and easily understood to any one who has had no experience. Fig. 9 represents the young shoot (in this instance of the pear) from which the buds are to be cut; fig. 10, the appearance of the shoot after the leaves have been cut off, before using; fig. 11, the position in which it is held in the hands for cutting the bud; fig. 12 is an enlarged representation of the process of cutting; fig. 13, the appearance of the bud after cut off, while the dotted lines on fig. 14 show where the cut is made; fig. 15 is the cut and opening in the stock before inserting it; fig. 16 is the bud already inserted; and fig. 17 shows the whole process finished and the ligature in place. The following spring the stock is cut down an inch or two above the bud, and after growing a few weeks the new shoot is tied up to it, as in fig. 18, to make it straight, and to prevent the wind

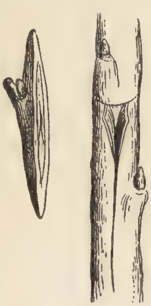


Fig. 15.

Fig. 16.

Fig. 17.

Fig. 18.

from breaking it. This operation is not however always absolutely necessary.

It will be observed that in order to do the work well, the knife must be sharp, so as to cut a smooth face to the bud when separated from the shoot; 2d, that the present year's shoot from which the bud is taken should have begun to form its terminal bud, which will show that the buds are ripe enough; 3d, that the ligature must be drawn tight enough to bring the bud and stock into close contact, but not so tight as to cut or bruise the bark; 4th, that the ligature must be taken off when the growth of the stock causes it to cut into or indent the bark.

The time for budding will depend on the condition of the buds and stock, and varies with different kinds of trees. The cherry, for example, will be fit to bud soon after midsummer, and the operation will not succeed if it is left till late in summer, unless the stocks happen to be in an unusually thrifty state. The pear may commonly be budded later than the cherry, and the apple later still; while the peach and dwarf pear are budded near the close of summer, or in early autumn.

Grafting is done in spring before the buds open. The two most common modes are cleft-grafting and whip-grafting; the former where the stock is much larger than the graft, and the latter where both are nearly of the same size. To succeed well the knife must be sharp, so as to cut smooth, even faces; the pressure should bring these faces everywhere into close contact, and all the cut parts must be covered outside with grafting wax or grafting plasters.

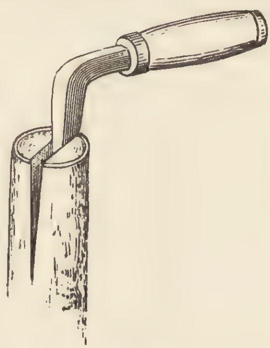


Fig. 19.—*Opening the Cleft.*

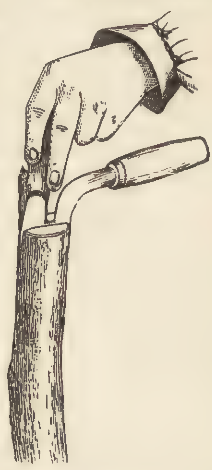


Fig. 20.—*Cleft-Grafting.*

Fig. 19 shows the mode of opening the cleft in cleft-grafting, the elbow in the wedged tool allowing it to be driven with a hammer if necessary; fig. 20, the mode of inserting the graft, which is shown in fig. 21; while fig. 22 shows the mode of whip-grafting.

Grafting wax is made by melting together rosin, beeswax and tallow. The exact proportions are not essential, provided it is soft enough to adhere with a little applied warmth; and hard enough not to melt in the sun. A good mixture consists of four parts of rosin, three of beeswax and two of tallow; if found too hard, add a little more tallow. It may be spread on thin paper or muslin, and applied as plasters, or applied alone.

Fig. 21.—*Prepared Graft.*

Fig. 22.—*Whip-Grafting.*

The operations of budding and grafting are performed essentially in the same manner, whether applied to young trees in the nursery row or to older trees at standard height.

Root-Grafting is adopted by nurserymen, and has the advantage of being performed during the spare time of winter, and the grafts, being set out afterwards into the nursery rows early in spring, grow at once without further care, except training and cultivation. Budding nursery trees usually gives better roots and finer trees, but requires more attention, namely—first, in budding; secondly, removing ligatures, and thirdly, cutting back the stock the following spring.

Selection of Varieties.—Everything depends on a good selection of sorts, whether the planter raises and buds and grafts his own trees, or purchases them of others. There are some important requisites in selecting varieties, among which are healthiness of growth, productiveness, sufficient hardiness, agreeable flavor in the fruit, earliness, succession and long-keeping qualities, and a due proportion of each sort to give a constant supply throughout the year. With a poor selection, the inexperienced planter may get crooked, feeble trees; they may be cut down by winter in northern localities; they may give him poor or knotty fruit, or furnish too many at one time of year, and too few, or none, at another.

In giving the following list of varieties to supply the yearly circle of finest fruits, the times of ripening apply nearly to the neighborhood of New-York city and Rochester. They will ripen about one day earlier for every twelve or fifteen miles going south, and about as much later in passing northward. This rule will not possess perfect accuracy or uniformity, as the time of ripening is controlled more or less by soils, aspects, exposure, altitudes and peculiarities of the seasons. It will, however, afford approximate assistance in arranging for a continued succession.

STRAWBERRIES.

Strawberries are the earliest hardy fruits which ripen in the open air. The first begin about the middle of June, and the later sorts extend the period into July.

VARIETIES.—As the same sort does not always succeed alike in every place, we give a few lists made for us by cultivators of experience in their several localities: A. M. Purdy of Palmyra, N. Y., (editor of the Fruit Recorder,) names for a succession Metcalf's Early, Downer, Wilson, Green

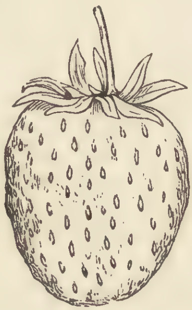


Fig. 23.—*Nicanor (large specimen.)*

Fig. 24.—*Wilson (full size.)*

Prolific, Jucunda and Kentucky. F. R. Elliott of Cleveland, Ohio, (ex-secretary of the American Pomological Society,) selects Ida, Wilson and Triomphe de Gand. Wm. Parry of New-Jersey, who has a hundred acres

Fig. 25.—*Green Prolific.*

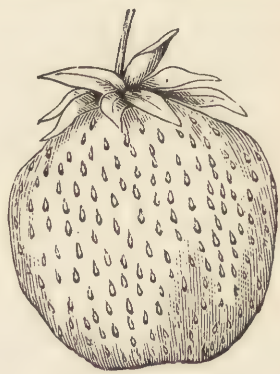


Fig. 26.—*Seth Boyden.*

in small fruits, gives a longer list, named in the order of ripening: New-Jersey Scarlet, French, Wilson, Seth Boyden, Charles Downing, Monarch of the West, Dr. Warder, Black Defiance, Col. Cheney, Late Prolific, Kissena and Kentucky. W. C. Flagg of Illinois, present secretary of the

Fig. 27.—*Triomphe de Gand.*

Fig. 28.—*Jucunda* (*medium size.*)

American Pomological Society, names Wilson and Green Prolific, ten times as many of the former as the latter. In the catalogue of the American Pomological Society, Wilson is recommended in all the States except Kentucky and North Carolina, with high commendation in most. Longworth's Prolific and Triomphe de Gand stand as worthy of cultivation each in twenty-two States; Charles Downing, Agriculturist and Hovey's Seedling, in sixteen States; Kentucky, as of high promise, in seventeen States; and Green Prolific is recommended in fourteen States. President Wilder and Nicanor are recorded as of high promise in several States.

COMPARATIVE TIMES OF RIPENING.
(*Shown by horizontal position, the earliest at the left, latest at the right.*)

Large Early Scarlet. Triomphe de Gand.....
Jenny Lind....... Jucunda.. ....
Nicanor........... Kentucky..............
Wilson...............
Downer's Prolific...
Ida....................
Green Prolific........
Chas. Downing.......
Hovey's Seedling......
Agriculturist....... ...
Longworth.........
Seth Boyden......

CHERRIES.

Nearly as early as the earliest strawberries, are the Early Purple Guigne, and other early Cherries. The different varieties furnish a succession till the end of July.

It should be always remembered that to obtain their true excellence, all cherries should be allowed to become fully ripe; they are frequently picked when merely colored and with a half developed flavor.

VARIETIES—HEARTS AND BIGARREAUS.—*Early Purple Guigne*, (fig. 29,) a dark purple cherry of medium size, tender, rich and sweet; the tree with slender shoots, and drooping leaves on long foot-stalks. It is a good bearer, and ripens by the middle of June in average seasons.

Belle d'Orleans, pale yellow, partly reddened, medium in size, round,

Fig. 29.
Early Purple Guigne.

Fig. 30.
Coe's Transparent.

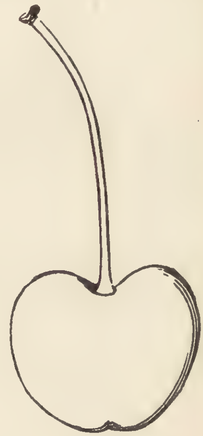


Fig. 31.
Rockport Bigarreau.

Fig. 32.—*Black Tartarian.*

Fig. 33.—*Yellow Spanish.*

Fig. 34.—*Elton.*

sweet, juicy and delicious; tree a good grower and bearer; ripens closely after Early Purple Guigne.

Coe's Transparent, (fig. 30,) medium in size, round, pale amber mottled with pink; tender, sweet and excellent; tree handsome, vigorous and productive—one of the best of cherries, ripening during the last half of June. About the same time ripen Governor Wood and Knight's Early Black, the former a fine, light-colored, and the latter an excellent black cherry, which may be included in the larger collections, although hardly so valuable as Coe's Transparent. Immediately following these, and often ripening with them is

Rockport Bigarreau, (fig. 31,) a large, deep-red fruit; flesh a little firm, with a rich and excellent flavor; tree a fine grower and great bearer, and altogether one of the most valuable sorts.

Black Tartarian, (fig. 32,) is sometimes a little later if fully ripe, but it is often picked while yet immature, partly grown and only dark purple in color. When fully grown, it is rounded, glossy black, of a mild, sweet flavor, and of a peculiar liver-like texture. It is a strong, upright grower and profuse bearer.

Following these earlier ones, come the large, beautiful, wax-colored *Yellow Spanish*, (fig. 33,) the firm, reliable *Elton*, (fig. 34,) and the large, showy, firm-fleshed *Napoleon Bigarreau*. Later are the large, black *Mezel*, and the acid but reliable *Red Jacket*.

THE SOUR CHERRIES—DUKES AND MORELLOS.

Early Richmond, (fig. 35,) medium in size when fully ripened; clear, deep red; very juicy; a rich acid; the foot-stalk often withdrawing the stone from the fruit when picked; a productive, very hardy and reliable sort, East and West; ripens latter part of June, but often picked two or three weeks sooner, before its full size and rich flavor are developed.

Fig. 35.—*Early Richmond.*

Mayduke, large, round heart-shaped, black when ripe, but often gathered when on-

Fig. 36.—*Belle Magnifique.*

ly dark red; rich and excellent when mature; growth rather upright for a duke; ripens late in June and into July.

Belle Magnifique, (fig. 36,) large, bright red; tree rather upright—a moderate grower, but great bearer. July.

Large English Morello—large, roundish, nearly black; rich, acid. Forms a round, handsome head, and bears good crops; valuable as a late cooking sort, ripening towards the end of July and into August.

COMPARATIVE TIMES OF RIPENING.

(*Shown by horizontal position.*)

Early Purple Guigne.	Elton........
May Bigarreau.. ..	Red Jacket......
Belle d'Orleans....	Yellow Spanish...
Coe's Transparent.	Napoleon....
Early Richmond.......	...Downer........
Black Tartarian. ...	Belle Magnifique..
Knight's Early Black...	Reine Hortense...
Gov. Wood.......	Carnation......
Rockport..	Morello.........
Mayduke........... ...	

For a small select list for a succession for home use, take Coe's Transparent, Early Richmond, Black Tartarian or Rockport, and Morello.

CURRANTS.

Currants follow strawberries and early cherries. They are very hardy, easily propagated, easily managed, produce certain crops of excellent and wholesome fruit which may be used for many purposes, with and without cooking. There is no reason why every family that has a square rod of garden should not have an abundant supply.

Currants are easily propagated by cuttings. A yearling shoot six or eight inches long, which has been cut off close to the old wood, early in spring, is inserted two-thirds of its length into the ground, and it will make a strong well-rooted plant by autumn. To prevent suckers from springing up below the surface of the ground, cut off the buds on the lower part, as shown in fig. 37. The rooted plants will be like fig. 38 after a few weeks of growth. Keep the ground well cultivated and properly enriched with manure, and the bushes will bear a profusion of large fruit. With neglected culture the fruit and bunches will be much smaller. As the bushes grow older cut out the old stunted and crooked wood, and allow the young and vigorous shoots to take its place.

Fig. 37.

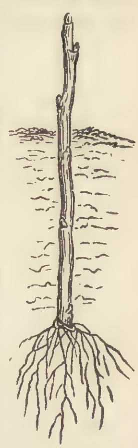


Fig. 38

VARIETIES.—The *Red Dutch* and *White Dutch* are old, well known and

reliable sorts, of moderate size and good quality. The *White Grape* is much larger, and of excellent quality; the bush, not very vigorous in growth, must be kept well cultivated. These are the earliest.

The *Cherry* and *Versailles* are very large, closely resembling each other, but the latter has longer branches. We have measured specimens of the Cherry currant five-eighths of an inch in diameter. These two varieties are rather acid, but are excellent when allowed to hang long and ripen on the bushes.

Victoria and *Prince Albert* are valuable for being very late, the latter pale red, and the former bright red in color.

Fig 39.—*Versailles Currant,* (*full size.*)

GOOSEBERRIES.

Gooseberries are to be cultivated and treated in the same way as currants. Nearly all the English sorts being liable to mildew, the American varieties are now generally planted. Among the best of these is the *American Seedling*, (yellowish,) which is small; *Houghton's Seedling*, (red,) larger; *Mountain Seedling*, (red,) fruit still larger, with a thick skin; *Downing*, (pale green,) one of the best of all native sorts; and *Smith's Improved*, (yellowish,) which is like the American Seedling, but larger.

Currant Worms are easily kept from gooseberry and currant bushes by promptly dusting them with white hellebore on the first appearance of the insects.

RASPBERRIES.

These ripen about the same time as currants, or at the North about midsummer. They are easily propagated and managed, but will not succeed well with neglected treatment. The suckering sorts, including the Antwerps and the many varieties which have sprung from them, reproduce themselves rapidly, and all that is necessary is to secure the suckers and transplant them. On a large scale, nurserymen propagate them by placing short cuttings of the roots in a propagating house with bottom heat, or in a hot-bed. When rooted they are transplanted to open ground. The Blackcap varieties are propagated from the tips of the re-curved shoots, which are fastened to the ground and slightly buried after mid-

summer. They root, and are then separated from the original plant and set out.

The stems of the raspberry are biennial, the canes growing the first season and bearing fruit the second, after which they die, and the new ones take their places. As soon as growth ceases in summer the old canes should therefore be cut away. When the new canes have reached a sufficient height, the tips should be pinched off, to prevent their growing taller, which will cause them to become stout and thick, and to send out side shoots, which in turn should also be pinched back when they have grown a foot or so in length, being shorter above and longer below. With the Cap varieties they should not be more than two and a half feet high, which will obviate the necessity of staking. The Antwerps may be pinched back at three or four feet, but usually this is omitted, in which case they need stakes. The height should vary with the vigor of the plant, strong plants requiring more height. When suckers are numerous they must be cut away when they first appear, or they will enfeeble the plants. Four or five canes are enough to leave for each stool.

VARIETIES.—The best Cap varieties are the following :

Davison's Thornless, the earliest blackcap ; the canes nearly free from spines ; the fruit rather sweet and of moderate size ; sometimes quite productive, oftener only moderately so.

Doolittle, a well known, productive and good sort, following the Davison.

Fig. 40.—*Philadelphia Raspberry.*

Fig. 41.—*Hudson River Antwerp.*

Seneca Black Cap, one of the best of this class—vigorous and very productive, with a high-flavored fruit.

Mammoth Cluster, a strong grower and very productive variety ; the fruit large for a black-cap, of good quality, and ripening later than most sorts.

The *Philadelphia*, (fig. 40,) although in its growth resembling the black-caps, suckers freely, and is thus rapidly propagated. It is hardy and is one of the most productive of all raspberries ; of moderate flavor and medium size.

Among the Antwerp varieties (which sucker more or less freely) are the following:

Hudson River Antwerp, a large, bright red, high-flavored raspberry, extensively cultivated in Ulster county, New-York, and other places on the Hudson River, where the soil seems peculiarly adapted to it, and where it proves eminently profitable; but it fails in many other places. Its peculiar shape is shown in the accompanying cut, (fig. 41.) Tender, and needs laying down for winter.

Fig. 42.—*Clarke Raspberry.*

Franconia, purplish red, rather firm, of good quality; canes nearly or quite hardy. *Naomi* closely resembles Franconia, if not identical.

Clarke, (fig. 42,)—fruit red, rather large, and of fine quality; canes quite hardy. Rather soft for distant market.

Knevett's Giant, *Hornet*, (fig. 43,) *French*, *Kirtland* and *Fastollf*, are fine sorts of this class.

Brinckle's Orange is one of the best of the yellow sorts, hardy, very productive, but too soft for market, and failing in some localities. One

Fig. 43.—*Hornet Raspberry.*

of the finest of the new sorts is the *Herstine*, (fig. 44,) hardy, but too soft for distant market.

The following numbers in the Catalogue of the American Pomological Society, representing the States in which they are recommended, will

Fig. 44.—*Herstine Raspberry.*

show the relative popularity of each sort of raspberry in the Union : Mammoth Cluster, 28 ; Philadelphia, 22 ; Franconia, 15 ; Brinckle's Orange, 14 ; Doolittle, 13 ; Hudson River Antwerp and Clarke, each 11 ; Fastollf, 9 ; Knevett's Giant, 6.

BLACKBERRIES.

Blackberries are propagated by cuttings of the roots, and from suckers. The plants are larger and require more room than raspberries, and more care to keep them well pinched back in summer, so as to be restrained within bounds and rendered more productive. There are four well-known varieties of value—the *Dorchester*, *Kittatinny*, *New-Rochelle* and *Wilson.* The two first named are hardy ; the two last partly tender. The Kittatinny is the best for general cultivation. The *Snyder* is a new sort highly recommended, but little proved as yet.

Blackberries immediately follow raspberries, and fill a vacancy just before early peaches and the earlier autumn pears.

PEARS.

The earliest pear is the *Summer Doyenne*, (or Doyenne d'Ete,) and although small in size and moderate in quality, the tree bears early and yields abundant crops. The fruit is roundish, with a brownish red cheek, and of a sweet and pleasant flavor. It ripens about the middle of July and continues till August.

Madeleine is nearly as early, much larger, and rather better in quality, but has been more neglected of late years than its merits deserve. It is medium in size, short pear form, greenish yellow, juicy and melting, and with a pleasant and sprightly flavor. The tree is a strong, tall grower and moderate bearer. In some localities it is defective in quality.

Bloodgood ripens soon after Madeleine, and in most soils produces buttery and melting excellent pears of medium size. The tree is a moderate grower. Sometimes the flavor is poor.

Dearborn's Seedling is a yellow, small, but excellent late summer pear, juicy, sweet and melting. The tree is a good and handsome grower, and begins to bear when quite young.

Beurre Giffard ripens about the same time as Dearborn's Seedling, and although the tree is a slender and crooked grower, the pears are so excellent that it should be in all complete collections. The best way is to graft this sort at standard height into some straight and vigorous stock. The fruit is medium in size, pear-shaped, greenish, and is juicy and melting.

Rostiezer is a small but excellent pear ; the tree is a thrifty but somewhat irregular grower, bearing enormous crops. Sometimes the fruit is only second-rate in quality. It ripens near the end of August.

Tyson.—The pear is of medium size, yellow, with a red cheek ; the flesh buttery and melting, and with a sweet, aromatic and excellent flavor. The tree is a handsome, upright grower, but comes late into bearing unless worked as a dwarf on quince.

The preceding seven sorts will give a continued succession of ripe pears from about the middle of summer till autumn, and if there is not room for all, the Summer Doyenne, Bloodgood, Giffard and Rostiezer will maintain a supply. They should be gathered in time and kept in a cool apartment. It must not be forgotten that all these sorts are much better for being picked at least a week before maturity and house-ripened. There are some other excellent summer pears, but these are the sorts most commonly esteemed.

Autumn Pears.

Washington is a handsome, medium-sized, very sweet and excellent pear, juicy, but not buttery ; a good straight grower and fine bearer ; ripens just before the Bartlett.

Bartlett, the most popular of all pears in this country. The tree is a handsome and vigorous grower, begins to bear while very young, and continues to yield great crops of large, handsome, buttery and melting pears.

As far south as Philadelphia it is a late summer variety; in New-York State, and in New-England, it ripens about the middle of September. As a summer and early market sort it has no rival.

Doyenne Boussock ripens nearly with the Bartlett; the tree is vigorous, handsome and hardy; the fruit large and fair, becoming, when ripe, soft and buttery, and of fine quality.

Seckel is well known for its high flavor and unsurpassed richness and excellence; the tree a slow grower, but hardy and productive.

Howell is a rather large, fair and handsome pear, of good quality, growing on a tree of great vigor, which bears while young. It ripens the latter part of September. It promises to be a good market sort.

Belle Lucrative, greenish yellow, of medium size, variable in quality, but when at its best is sweet, melting and delicious, not equalled in quality by more than two or three sorts.

Flemish Beauty, when not attacked by the black fungus or cracking of the fruit, is one of the finest and most reliable sorts; tree very hardy, enduring severe winters at the West, and bearing abundant crops of large, handsome, buttery and melting pears.

Beurre Bosc, a large, long, pear-shaped fruit of great excellence and fine appearance; tree somewhat irregular in growth, a good bearer, and one of the most valuable market sorts. It ripens about mid-autumn.

Louise Bonne of Jersey and *Duchess d'Angouleme* are cultivated exclusively on quince stocks as dwarfs, for which mode of culture they stand pre-eminent.

Beurre d'Anjou is generally regarded as a fruit of great value. It is large in size, greenish yellow, the flesh melting, with a pleasant and excellent flavor. It ripens late in autumn, and in a cool apartment may be kept till mid-winter.

There are several other valuable autumn pears which might be added to this list, such as Sheldon, Clapp's Favorite, Urbaniste, Autumn Paradise, Doyenne du Comice, Beurre Superfin, Beurre Diel, Ananas d'Ete, &c.

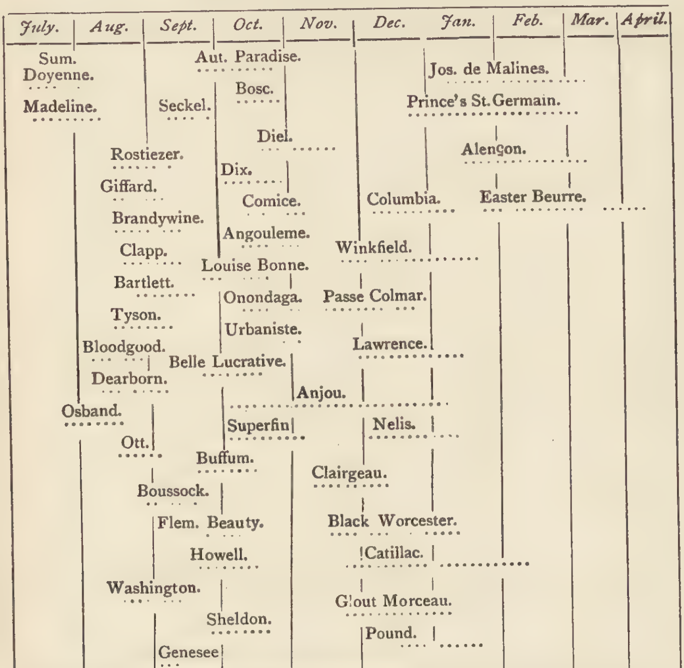
As already alluded to, summer and autumn pears which are approaching maturity should be gathered while yet hard, as soon as the stem will become loosened when the fruit is slightly raised. Many fine crops are spoiled by allowing them to ripen on the tree, causing core-rot, and wasting the flavor. After gathering they may be placed in boxes, drawers, or on shelves covered with woolen cloth or carpet. The exclusion of light is important.

Winter Pears.

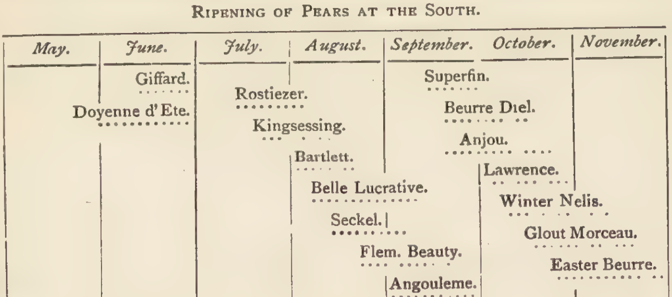
In this list many will place Beurre d'Anjou (already mentioned under autumn pears) at the head. It is certainly one of the finest sorts, and although some of the earliest specimens will ripen in a warm room by mid-autumn, many others may be kept three months longer, if after gathering they are placed in a cool out-house facing north, and afterwards in a suitable fruit-room a few degrees above freezing. A year or two since, fine

specimens were exhibited at the Boston Horticultural Society Rooms on the 15th of March.

RELATIVE TIME OF RIPENING OF PEARS.



RIPENING OF PEARS AT THE SOUTH.



Lawrence—size full medium; color light yellow; flesh juicy, partly melting, very sweet. Tree moderate in growth, shoots spreading, bearing good, uniform crops. One of the most valuable early winter pears.

Winter Nelis, rather small, greenish and russeted; fine grained, buttery and melting; of excellent flavor. The tree is a slender, crooked grower, and therefore makes the best appearance when worked standard height on some straight and vigorous stock. It is a profuse bearer, and the pears are larger and much better in quality when thinned while small.

Beurre Gris d'Hiver, rather large, greenish yellow and russeted; an excellent early winter sort.

Josephine de Malines—in size medium; distinguished by its broad crown, long stalk and fawn-colored flesh; somewhat variable in quality in different localities, but where it succeeds best, an exceedingly juicy, melting, sweet, aromatic and excellent pear; ripens at mid-winter, and will keep into March. The tree a rather moderate or slender grower.

Besides the foregoing, we may add the *Vicar of Winkfield*, a strong growing, exceedingly productive and large and showy early winter pear, good for cooking, and requiring thinning on the tree. *Beurre d'Aremberg*, a medium sized, greenish yellow, partly russeted, fleshy stemmed pear, rich and rather acid; also in early winter. *Glout Morceau*, large, sweet, juicy; best on quince. *Dana's Hovey*, a small, but excellent sort. *Columbia*, a smooth and fair fruit, pleasant, juicy and refreshing when well ripened, a little later than the preceding. *Doyenne d'Alencon*, a fair, yellow pear of moderate quality, but a good, hardy, reliable sort; and *Easter Beurre*, a long keeper, often good in April; large, excellent sort, hardly adapted to the North, unless in a warm, rich soil, with good culture and thinning, but well adapted to the South, Southwest and California.

Fig. 45.

Besides the above, the *Catillac* and *Pound* are large, free-growing sorts, only suited to culinary purposes.

For those who have room in their gardens for dwarfs only, the following sorts will succeed best: Dearborn's Seedling, Giffard, Tyson, Doyenne Boussock, Louise Bonne of Jersey, Duchesse d'Angouleme, Beurre Superfin, Beurre Diel, Anjou and Josephine de Malines.

Pruning Pear Trees.

Directions have been given in former volumes of this work for pruning standard and dwarf pear trees, and we add a few hints relative to changing the tops of such sorts as are found poor or unprofitable. The old and common way is to cut off the stem or a few of the larger limbs, and insert a

small number of grafts, which, after a lapse of some years will form a new head. A better and more expeditious way is to graft a large number of the smaller limbs over the whole top, by which a new head is obtained in a comparatively short period of time. Large dwarf trees have been thus completely changed into full bearers of the new sorts in three years. Fig. 45 represents the tree to be re-grafted; fig. 46, the same with about thirty grafts set in its branches; and fig. 47 a similar tree with only a dozen grafts. The former will form a new head in less time, the latter with less labor.


Fig. 46.


Fig. 47.

Fig. 48 shows a full-sized bearing dwarf tree of Louise Bonne of Jersey,


Fig. 48.

which has been carefully trained and managed according to the directions given in former volumes.

Feeble or crooked growing pear trees, of such sorts for example as Winter Nelis, Giffard, &c., mav be grown in straight, vigorous and handsome shape by grafting on the best stocks at standard height. Fig. 49 represents young trees of Winter Nelis as frequently seen, showing the crooked form when grafted low down, and fig. 50 a tree of the same sort obtained by re-grafting the top of a Virgalieu which had proved worthless by the cracking of the fruit.

Fig. 49.

Fig. 50.

PEACHES.

Season of Ripening and Succession of Sorts.—The early peaches in the Northern States begin to ripen about the middle of August. Some of the new sorts yield ripe fruit early in August in favorable seasons. The late varieties, which give a supply about the middle of October in the Middle States, do not ripen into excellence farther north, and are smaller and more acid. Usually, however, good peaches may be had in all places as late as early October by a proper selection of sorts. As we proceed farther south, the ripening is much earlier and the season of supply lengthened. In the Gulf States the Early Tillotson matures by the middle of June, Hale's Early nearly by the first of June, and by a succession of sorts peaches may be had there fresh from the trees, from the first of June till the middle of November, a period of more than five months. In the Northern States the period is two months only, gradually lengthening as we go south.

Varieties.—The earliest good peach, which has been well proved, is *Hale's Early*, a good, medium-sized, round, red peach, growing on a vigorous and very productive tree; the liability to rot in most locali ties is a serious drawback on its value, and requires early gathering. *Early Beatrice*, a new English variety, is claimed to be several days

earlier. In the more southern States, Hale's Early ripens early in June; in the North the middle of August, with variations for seasons, and about one day earlier, on an average, for every ten or twelve miles going south.

Early Tillotson is an excellent, red, early peach, a few days later than Hale's Early, with the drawback at the North of mildewed leaves and shoots, but one of the best sorts in the Southern States.

Serrate Early York is a medium-sized, slightly oval peach, juicy and melting, ripening soon after Tillotson, and often at the same time—during the last half of August in the Northern States. Tree a moderately good, slightly irregular grower, and good bearer.

Troth's Early, a medium-sized, bright red, slightly oval peach; the tree vigorous and productive; a valuable market sort in the Middle States, ripening nearly with the last mentioned variety.

Cooledge's Favorite, beautiful, red cheeked, juicy and melting, with a rich, sprightly flavor; the tree vigorous, hardy and productive—immediately following the three last. About the same time the *Early Newington* (freestone) matures—an excellent, rich and juicy peach, adhering partially or slightly to the stone; a moderate bearer, and one of the finest sorts for home use.

Large Early York, *Haines' Early Red*, *Grosse Mignonne* and *George the Fourth*, are large, round, red-cheeked peaches, of excellent quality, ripening late in August at the North, and by the middle of July in the Southern States.

Crawford's Early, very large, roundish oblong, yellow, with a red cheek; very juicy, and with an excellent flavor. It ripens early in September; is more extensively planted at the North for market than any other sort.

Oldmixon Freestone, a large, roundish, slightly oval fruit, with a red cheek on pale yellow skin, quality excellent, tree hardy and productive; ripens middle of September. About the same period *Morris' White* ripens, a clear, creamy, white peach, of fair quality, and much esteemed for canning.

Stump the World is still later, and extends the supply of freestone peaches as late as they will mature well in the Northern States. Its season is soon after midsummer at the South, where it is succeeded by *Ward's Late Free*, *Lady Parham*, *Julia* and *Baldwin's Late*, which furnish a supply into November.

Oldmixon Cling and *Heath Cling* are valuable cling-stone varieties, the latter not always ripening at the North, but in the middle and western States it is a very large, rich and valuable sort.

NECTARINES are in every respect similar to peaches, except that they have a glossy skin like the plum, and need special protection from the curculio.

RIPENING OF PEACHES AT THE NORTH.

August.	*September.*	*October.*
	Morris' White.	
Hale's Early.		
	Ward's Late.	
Cole's Early Red.		
Tillotson.	Bergen.	
Cooledge.		Heath Cling.
Serrate E. York.		
	Oldmixon.	
E. Newington.		
Large E. York.		
George IV.		
	Nivette.	
	E. Crawford.	
	L. Crawford.	

RIPENING OF PEACHES AT THE SOUTH.

June.	*July.*	*August.*	*September.*	*October.*	*November.*
Hale.		L. Crawford.	Fruitland Seedling.		
		Oldmixon.			
Tillotson.		Stump the World.		Lady Parham.	
Serrate E. York.		Columbia.			
					Julia.
Troth.		Newington Cling.			
	Large E. York.	Gaylord.			
	E. Crawford.		Piquet's Late.		
	Bergen.		Heath Cling.		

PLUMS.

The *Cherry Plum*, also called the *Myrobolan*, has the only merit of being very early, or ripening about midsummer at the North. It is small, bright red, with a juicy, slightly fibrous, flesh, adhering to the stem; sub-acid and not rich. The *Primordian* or *Jaune Hative* ripens about the same time and is a small, yellow, rather sweet plum, with a mild flavor, the flesh quite free from the stone; the tree a feeble grower

and not hardy. These two very early sorts may be included in large collections.

They are followed by several varieties of moderate or rather small size, as *Early Tours*, small, blue, rather sweet; *Howell's Early*, small, reddish brown, juicy, sweet and good; *Rivers' Early Favorite*, small, bluish black, juicy and excellent; *Imperial Ottoman*, nearly medium, greenish yellow, very juicy, sweet and excellent, tree hardy and a great bearer; *Early Royal* or *Royal Hative*, medium, light purple, with a rich, high flavor; *Hudson Gage*, medium, yellow, melting, rich and very good, somewhat resembling Imperial Gage; and *Early Orleans*, a medium-sized, reddish purple plum, of moderate flavor. These seven varieties succeed variously in different localities, and the planter who has room for them all will find them, or a part, to afford him a valuable supply of early fruit before the great crowd of later varieties appear.

A more choice and limited selection may be made of medium and late sorts, among which may be mentioned the rich, excellent, yellowish green *Lawrence's Favorite*; the hardy, productive, yellow, pleasant and reliable *Prince's Yellow Gage*; the rich, large, orange-dotted and admirable *McLaughlin*; the hardy, productive, good and reliable *Lombard*; the strong-growing and productive *Smith's Orleans*; the very productive, valuable and late *Reine Claude de Bavay*; and the large, beautiful, excellent, productive and late *Coe's Golden Drop*. In addition to these we may add *Monroe Gage*, a plum of moderate size and flavor, but exceedingly vigorous, reliable and productive; *Schenectady Catherine*, small, but very sweet, juicy and excellent; *Green Gage*, the sweetest and highest flavored of all plums, but a feeble grower; *Red Diaper*, a large and excellent, purple plum, but the tree of slow growth; *Bradshaw*, a large, showy and good fruit, the tree of strong growth, but often a sparse bearer; the *Washington*, large, handsome and fine, but often rotting badly on the tree; and *Jefferson*, large, beautiful and excellent, and when well grown and ripened, unsurpassed and scarcely equalled; the tree rather tender. *German Prune*, *Fellenberg* and *Saint Catherine* are valuable for prunes, drying and cooking. The *Wild Goose* and *Miner* are good varieties of the wild plum, and will flourish in many places where the common plum fails.

The plum usually succeeds best on a strong or rather clayey soil, which requires to be kept clean and mellow by cultivation. The Wild Goose and other wild plums succeed well on sandy or lighter soils. The crop commonly fails, either partly or wholly, on account of the attacks of the curculio, which punctures the young, newly-set fruit, and lays its egg, which soon hatches to a worm or larva, eats into the flesh, and sooner or later causes it to drop. The remedy is to insert short, thick, iron rods into the trunk or larger limbs, and by the sharp blow of an axe or hammer on the heads of these irons, the insects or beetles, at the time of laying eggs, are jarred off, and may be caught on spread muslin sheets, and quickly killed

with thumb and finger. The sharp blow on the iron gives a sudden jar which few insects can withstand; the former remedy of a padded mallet struck on the bark was far less effectual and a common cause of the failure of this remedy. The jarring must be continued at least once a day, without intermission, as long as any curculios are discovered. We have found the annual expense of protecting the crop of a plum orchard of seventy trees to amount to not more than six cents per tree.

The Catalogue of the American Pomological Society for 1873 gives the substance of the reports from different States, of which the following is a summary: Lombard is recommended in 20 States, Wild Goose and Damson in 19, Washington and Imperial Gage in 17, Smith's Orleans and Coe's Golden Drop in 16, Jefferson in 15, Prince's Yellow Gage in 14, Green Gage in 13, Reine Claude de Bavay and McLaughlin in 11, Lawrence in 9, and Bradshaw in 8.

The Apricot, nearly allied to the plum, but with a downy skin like the peach, is one of the most delicious of all summer fruits, still more valuable for its very early ripening, usually about the time of wheat harvest. It is liable to disease of the bark at the extreme North, but succeeds well in the Middle States. It absolutely requires protection from the curculio, even more than the plum. The best varieties are the *Breda*, *Early Golden*, *Moorpark* and *Peach.*

GRAPES.

The foreign or exotic grapes, to those who can afford the expense of ranges of houses and gardeners' salaries, may be made to furnish a supply of delicious fresh fruit for the table nearly every day of the year, the times of ripening being made to vary by forcing, cold and retarding houses. But as these houses are not within the reach of cultivators generally, the list of sorts here given will include only the hardy American varieties. Even with these alone, fresh grapes may be had through the whole of the autumn and winter months, and the cultivator who has a plantation large enough for a plentiful supply, and suitable apartments for keeping the fruit, may supply his table with grapes at the North from the first day of autumn till warm weather the following spring. Of the more common and well proved hardy grapes the following are among the best:

Hartford Prolific, the most popular and profitable early sort as yet generally cultivated, well known as a nearly black grape, rather sweet, good when fully ripe; the vine vigorous, very hardy and exceedingly productive. A fault is the liability to drop its berries.

Delaware, widely cultivated and highly esteemed for its sweet and delicious quality. The vine is a moderate grower, very hardy, bearing abundantly, often requiring thinning to prevent over-crops; the bunch and berry small.

Concord, remarkable for being universally adapted to all parts of the country, particularly the west. The vine is vigorous and very hardy; the large, black berry of moderately good flavor.

Isabella, an old sort of great value in localities to which it is adapted; a strong grower and profuse bearer; the fruit, when fully ripe, of excellent quality and a good keeper.

Diana—vine a good grower and bearer; fruit sweet, aromatic and of excellent quality; one of the best winter keepers.

There are some new varieties, good in quality, which promise to be much earlier than the Hartford, but not yet sufficiently tried; and there are several of the newer sorts which ripen later, which may ultimately become of established merit in certain localities, among which are *Wilder*, *Salem*, *Croton*, *Walter* and *Othello*. Among the older sorts the following may be included in large collections, viz.: *Creveling*, excellent in quality, but with thin bunches; *Clinton*, extremely hardy, best after long keeping; *York Madeira*, a moderate grower and bearer, with rather small but excellent fruit; *Catawba*, an admirable grape for the Middle and Western States, and ripening at the North in favored localities; its liability to rot has much lessened its value in many places; *Iona*, a fine sort in some localities, failing in others, often injured by overbearing; and *Rebecca*, one of the most delicious of American grapes, but with a vine having tender foliage.

APPLES.

The Apple, although not the most delicious, is the most valuable of all our fruits. It furnishes at the North, with a proper selection and care in keeping, fresh fruit for the whole yearly circle. *Early Harvest* and *Earlv Red Margaret*, and the first ripe specimens of *Summer Rose*, give us fresh apples in July. They are succeeded by *Early Strawberry*, *Red Astrachan*, *Primate*, *Williams' Favorite* and *Earlv Joe*, which continue till the end of August. *Carolina Red June* is a valuable early sort at the West. *Bough*, *Golden Sweet* and *Hightop Sweet* are fine sweet varieties.

The best autumn sorts are *Autumn Strawberry*, *Gravenstein*, *Porter*, *Maiden's Blush*, *Fall Orange* and *Fameuse*. *Duchess of Oldenburgh* is very valuable and hardy at the West, where it begins to ripen before the close of summer; and *Rambo* and *Smokehouse* are much esteemed in many localities except the more northern regions. *Twenty Ounce* is a large, showy, reliable market sort, much valued for cooking and keeping into winter. The best sweet varieties are *Munson Sweet*, *Jersey Sweet*, *Pumpkin Sweet* and *Autumnal Swaar*.

Among winter apples, the most valuable and popular are *Baldwin*, *Rhode-Island Greening*, *Hubbardston Nonsuch*, *Jonathan*, *Wagener*, *Westfield Seeknofurther*, *Roxbury Russet*, *Northern Spy*, *Northern Pippin*, and, for long keeping, *Poughkeepsie Russet*. *Ben Davis* is one of the most profitable apples at the West, as well as *Pryor's Red*, *Rome Beauty*, *Smith's Cider*, *Rawle's Janet*, *Winesap* and *Willow Twig*, *Green Cheese* or Carolina Greening, *Chattahoochee*, *Stephenson's Winter*, *Nickajack*, *Limber Twig*, *Hockett's Sweet* and *Shockley* are good or valuable winter apples at the South.

List of Fruits for Special Localities, widely approved.

Strawberries—*New-England.*—Wilson, Triomphe de Gand, Jenny Lind, Hovey's Seedling and Charles Downing.

Middle States.—Wilson, Charles Downing and Triomphe de Gand.

Southern States.—Green Prolific, Charles Downing, Longworth's Prolific, Wilson, Triomphe de Gand and Kentucky.

Western States.—Wilson, President Wilder, Nicanor, Longworth, Kentucky, Ida and Green Prolific.

Raspberries and Blackberries.—Nearly the same varieties succeed in the different States of the Union. The foreign or Antwerp raspberries are worthless in most places south.

The different varieties of the Currant succeed nearly alike in the Northern, Middle and Western, but fail in the Southern States.

Cherries.—The different sorts succeed in the Northern and Middle, and in some portions of the Western States. In most localities of the West the *Dukes* and *Morellos* are the only reliable sorts. At the South, all fail alike, except in a few regions where the Dukes and Morellos succeed to some extent.

Pears.—The different varieties adapt themselves widely to the various regions of the United States, and the lists already given may therefore be taken without much modification to all portions of the Union. For the South, *Bartlett*, *Belle Lucrative*, *Duchesse d'Angouleme* and *Anjou* are particularly successful.

Grapes.—The *Concord* is the sort of the widest adaptation; *Delaware* and *Hartford* succeed nearly as generally; *Ives* adapts itself to the South and West. *Scuppernong* is most highly esteemed in the Southern States.

Apples.—Select lists, adapted to different regions of the Union, in addition to the list already given, may be found in nearly every volume of Rural Affairs for past years, especially in volume III, pages 120, 214 and 291; vol. IV, pages 114, 213, 214, 220, 323 and 324; vol. V, page 292; and vol. VI, pages 279 and 280.

After a good supply of fresh fruit is raised, the next provision is a suitable apartment to keep it in. It is here that the great deficiency exists with many cultivators. Fruit decays rapidly if too warm, withers if too dry, and rots when too damp. We have known some cultivators to lose all their winter fruit by the end of March because only ordinary cellars were provided for it; while others, with no better crops, have kept a good supply perfectly fresh till the ripening of strawberries and currants, by means of well built and well managed fruit rooms.

The same causes which spoil and induce early rotting in winter fruit, prevent the keeping of late autumn fruit into winter. For example, take the Beurre d'Anjou pear, which if placed without care in warm apartments when gathered, may not keep into December; while with the best management, specimens have been retained perfectly fresh into February and March.

Late autumn and winter fruit intended for keeping, whether pears or apples, should be placed in as cool a building as can be provided, facing the north, until the near approach of freezing winter weather. A building made on purpose, with no windows on the south side for the admission of warm rays, and only enough east and west for free ventilation, would be best. During cool days and evenings the temperature may be reduced as low as may be, and kept nearly uniform by thermometers; and at mid-day, or when warm, the doors and shutters should be kept closed. It should be amply provided with shelves, drawers and bins.

It usually happens, however, that some outhouse may be wholly devoted to this purpose for the few weeks required, and used for other purposes at other times. A few days before the usual time of freezing up for winter, the fruit is assorted and carefully conveyed to the fruit-room. This may be an apartment in the cellar or basement, entirely separated from the rest of the cellar by an eight inch brick wall or other good partition. If there are windows on opposite sides, they will admit of ventilation when required; but where this is not the case they should be placed near each end, so as to cause a circulation of the air throughout. Much depends on the right degree of moisture or dryness in the fruit-room, and other influences being the same, it depends much on the character of the subsoil. If there is a fine, dry, gravelly or sandy bottom at all times of the year, so as to give a perfect natural drainage, the apartment will be dry enough with a smooth beaten, earth floor, and side walls of masonry. But if the cellar is dug in damp earth, clay or hardpan, which becomes saturated with water when long rains occur, or in early spring, a good thick cement floor and cement sides will be necessary. We have seen very wet cellar apartments made quite dry enough by means of a good water-lime bottom; but when this alone is not sufficient, an additional coating of the same material at the sides has made the whole quite dry enough. The windows should be hung on hinges, and hooks provided, so that they may be opened partly or wholly, according to the temperature of the air without. Two thermometers should be hung in different parts of the room, to assist in regulating the temperature, which should be kept within a few degrees of the freezing point with as little variation as practicable.

The fruit may be placed for keeping in boxes, drawers, or on shelves. It will keep well headed up in barrels or casks, so long as it remains free from decay, but when this commences the confined air only accelerates it. For common every-day use more ready access is best, when any decaying specimens may be seen and readily removed.

TRANSPLANTING.—It is a curious fact that nearly all trees and plants thrive better if transplanted at night, or in dark, cloudy days. An eminent German botanist says that this is owing to the absence at such times of the sun's rays, the chemical (or actinic) rays of sunlight acting injuriously on the parts of the plant not exposed naturally to light.

THE CONSTRUCTION OF GREENHOUSES.

By Prof. W. J. Beal, Agricultural College, Lansing, Mich.

LOCATION.—A greenhouse should not be placed where it will be much exposed to the prevailing cold winds. A south or east exposure is desirable.

THE FOUNDATION may be made of stone, brick or wood. A wall of stone or brick should go below the frost and be laid in mortar made of stone lime and water lime in equal parts, with the proper amount of clean, sharp sand. A good stone wall will be lasting, but it will cary off much heat from the building. It might be furred with a thin layer of wood, or lathed and plastered, using some water-lime. A solid brick wall for a greenhouse, in the climate of central New-York or Michigan, will last but a few years. Farther south, they are said to answer for the south and east walls. The heat and moisture within, and the cold without, cause the bricks and mortar to crumble and give way. A hollow, ten-inch wall of two tiers of brick bound together with strips of iron is warm and durable if made of good hard brick. Walls of wood are cheapest, dryest and warmest, and if well made, they are often more durable than walls of stone or brick. For such a wall, posts are used of cedar, chestnut, locust, or even oak, blue ash, or red cherry, set deep and firm. Such a wall will last twenty years or more.

THE CISTERN should be large enough to hold all the water which falls on the house during the year, so that none be wasted. As we are using water most of the time, the cistern should have about one cubic foot of contents to three or four square feet of ground covered by glass and potting room. We prefer them to be built underground, of bricks, arched over, just outside the house or under the centre of it. They are often built under the centre stage, and covered with planks, upon which rest the pots or a stage to support the pots. In this case the walls are about two and a half feet above the path. If such a cistern is left partly uncovered, the water soon becomes nearly as warm as the air of the house. Lead pipes run from the gutter or eaves-trough, underground to the cistern. If the cistern is outside or below ground, there should be a large open tank, made of boiler iron, cement or planks, in the house, to contain water until it has become warmed by the heat of the house. Water for plants should be at least as warm as the air of the house in which the plants grow. Above this tank should be a good force pump, with hose enough to reach any part of the house, to enable two men to shower the plants whenever desired.

DESIGNS for glass structures are almost endless. They are known as double span roofs, having a roof of equal extent on each side ; as lean-tos, with the roof all sloping one way from a high wall or building ; or as a

two-thirds or three-fourths lean-to, in which one of the walls is higher than the other, and the rafters are longer on one side of the house.

A lean-to is cheapest, but for most purposes a double span roof is the best. The latter, if running north and south, gives an equal distribution of light, so the plants grow symmetrically without being turned around every little while. A lean-to or two-thirds lean-to is rendered warmer with the same heating apparatus, on account of the protection of the high walls from the cold winds. The lower the houses are made, the better, provided they are high enough to afford room for the plants. In very high houses the air at the top is so much warmer than that near the ground that it is almost impossible to heat them suitably for plants, unless the plants are also elevated on a high stage near the glass. Plants "draw" or grow slender when grown far from the glass. Every man of experience will now say, "build low." For ordinary purposes, nine to twelve feet is enough for the extreme height. For good work, without regard to appearance, six or seven feet is much better. If a number of houses are to be erected, they can be joined in any way to suit the locality or the taste of the designer. If much extended in a line, they make a greater display, at the expense of economy in fuel. For mutual protection and convenience, it is better to place the houses close together.

It is a good way, now quite popular, to build three houses, with double span roofs, running north and south. These are joined side by side with a house for potting and packing (with furnace below) running along the north end. This room on the north affords protection from cold, does not obstruct the light, and permits the gardener to pass from one house to the other without exposure or opening of outside doors.

METAL SASH.—In England and Ireland many of the best houses have a framework of iron or copper. They present a fine appearance, are stout, durable, and do not obstruct the light, or harbor insects. Some have been tried in various places in this country, but so far as the writer can learn all have failed to give satisfaction, on account of the great extremes of our climate. These changes cause the glass to break, and the frame work conducts away the heat too rapidly in cold weather. We are not aware that any of the latest improved English patents have been tried in this country. Our best builders universally condemn a metallic frame.

GLAZING.—Choose glass about ten inches one way, double thick, and quite flat, so as to make tight joints. In curvilinear houses have the glass 8 by 10 inches where the curve is greatest, and 10 by 14 or 16 inches where the curve is least, all the sash being 10 inches apart. None of the glass in this case need be bent, but imbedded in soft putty made of kiln-dried whiting and white lead mixed in oil. Each glass is fastened with four zinc shoe nails half an inch long. One of these is placed at the lower edge on each side, to keep the lower glass in place and the upper glass from sliding down; the other two are an inch and a half farther up the sash. The

sash are one-sixteenth of an inch farther apart than the width of the glass. No putty is now used on the outside by the best builders, but some thick paint covers the upper edge of the glass, running on three-sixteenths of an inch. In England some of the best houses are now made without any putty or lap of the glass. They are free from drip, and permit any pane to be removed without disturbing those near it. Portable houses are

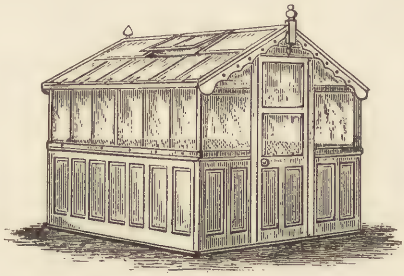


Fig. 51.—*Portable Greenhouse.*

there quite common. Fig. 51 represents a span roof structure 8 feet long and 6 feet broad, and so constructed as to be easily taken apart and packed for railway conveyance, and set up, again by means of screws. Its cost is fifty dollars.

Shading.—Ground glass is liked by some to obscure the light in summer, to prevent the plants from burning. They break more easily than plain glass, and they do not give so much light in winter, when we usually want all we can get. To obscure glass in long, hot days, whitewash of lime is often used ; but it acts unfavorably upon the sash, paint and putty. Indigo in hot water or linseed oil is cheap, easily put on, and answers a good purpose. Whiting in oil is nice. A favorite with many for nice houses is sugar of lead ground in oil and diluted with turpentine. Take but little at a time on the brush and put on thin ; before dry, dust or dab over with a light, dry brush, to break up the lines in the covering. Any of the above can be easily removed in autumn, especially with the aid of a little pearlash water. Some fix up curtains of muslin, tacked to the sash inside, or placed on rollers. Some have curtains outside, made to roll up under a cover on the ridge of the house. Graves, Selover & Willard, at Geneva, have a huge blind made like a window blind, of 7-inch boards—the whole large enough to cover one side of a commercial plant house. They can close them at night to save heat, and open to any extent during the day to get just as much light as they want. They like it, though they admit it is not very ornamental.

Double Glazing is not very common, though it saves much heat. The snow will not so readily melt off in winter ; dust and dirt and insects get in and look bad. It works well in perpendicular walls. Double

glass for a third of the way from the bottom is most needed, where the air is coldest. The inside glass need not lap or be puttied. Fig. 52 shows a section of a sash bar grooved for double glass. The glass may slide in from the top, and be removed for cleaning or replacing when broken.

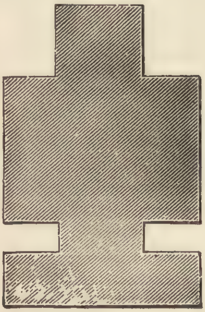


Fig. 52.
Section of Double Sash.

All nice houses above eight or nine feet in height should be supplied with King's patent apparatus to open the upper ventilators. It opens them all at once, to any extent desired, or closes them and holds them securely wherever placed. English sliding sashes for ventilation are clumsy affairs.

A CURVILINEAR ROOF has some advantages. It is more ornamental. The light is better, because the angle at which it strikes the glass is more varied. Such a roof gives head room next the sides of the house, without great height at the centre or next the wall of a lean-to. The roof is stronger, and needs no centre posts in a room twenty-five feet wide. It may be kept from spreading by half-inch rods running across from rafter to rafter, with right and left screws in the middle to arrange the tension. Paint the rods of the same color as the sash, so as not to be conspicuous.

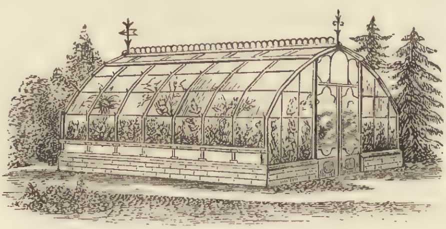


Fig. 53.—*Curvilinear Roof.*

Cost.—When well built, curved roofs are much more expensive, and, except for their finer appearance, straight slopes are preferable, all things considered. The cost of a house with curvilinear roof, heated with water, and stages for plants, is $2.50 to $3 for each square foot of ground covered. This does not include the cost of masonry. Houses with straight, double span roof, made plain and substantial, heated with water, and stages in, will cost from $1.50 to $1.90 per square foot, besides masonry. If made low for propagating, and posts of wood are used, they can be made and heated with water complete for about a dollar per square foot. If heated with flues, such a house will cost 45 to 60 cents a square foot.

Construction.—The curve for a curvilinear roof should not be just one arc, but it should curve most rapidly about one-third of the way from the

bottom or wall. This allows a good slope for the upper part of the roof, to prevent drip. The rafters are about three by six inches, cut from the timber with the grain, framed together and bolted, making one continuous piece from sill to ridge. They may make the lap in two ways, horizontally or vertically. In either case the joints will be covered by a five-eighths inch band on the inside and outside edges, well nailed.

The purlines are two by three inches, about six feet long, tenoned into the rafters and bolted to the opposite one, end to end, and placed not over four feet apart. There is a beveled coping on top of the sill, to turn the water off and to serve for the ventilators to shut against.

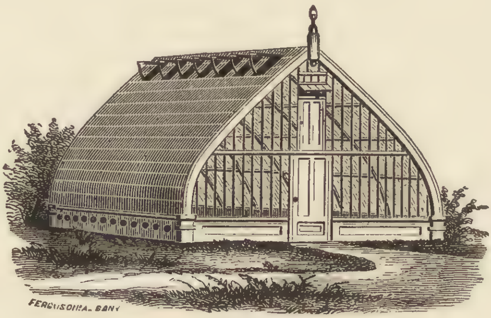


Fig. 54.

Fig. 54 represents a neat glass structure erected by Ellwanger & Barry of Rochester, combining the straight and curved rafter.

The side ventilators are hung at the top, and open outwards. They are

Fig. 55.—*Ventilators.*

held in place by iron straps and pins ; a screw eye holds the strap, one by one-eighth of an inch, to the ventilator ; holes in the strap catch on an iron pin in the sill. All side ventilators are best when made to open under the side shelf and over the pipes or flues, so as to warm the air before it

strikes the plants. Similar doors may be hung from the side beds in the house. The flues are often boarded up, to secure good bottom heat for the plants on the side shelves. Fig. 56 is a section of a cheap house on a scale of one-seventh of an inch to the foot, showing open ventilators under the stages and at the top of the roof.

Sash bars for a curved roof should be 1 by 1½ inches, cut on a radius to conform to the rafters, and well nailed in the grooves of the purlines. These bars only run from one purline to another. The

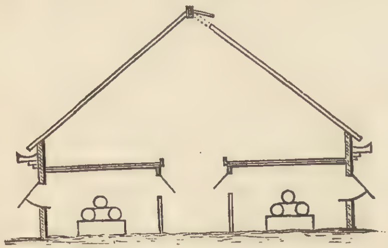


Fig. 56.—*Section of Cheap Greenhouse.*

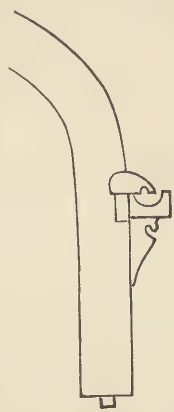


Fig. 57.—*Section of Eaves Gutter.*

plates are 2 by 4 inches. The gutter is of wood, about 4½ by 3 inches in width, the ends put square together with a piece four inches long and five-eighths wide curved galvanized sheet-iron driven into both ends of the pieces which meet. The gutters are held in place by a bracket, which is useful as well as ornamental. In winter place a foot-board over the gutter and let it rest on the sash above. Tack it fast. It will be found to keep ice from accumulating in the gutters. Fig. 57 is a section of gutter and bracket, and other pieces, showing how they are attached to the rafters and mullion posts, which are placed half way between the rafters. Notice the small groove under the edge of the piece which is just above the gutter. This prevents water from following back against the rafter. The lower glass begins just on the upper side of this piece.

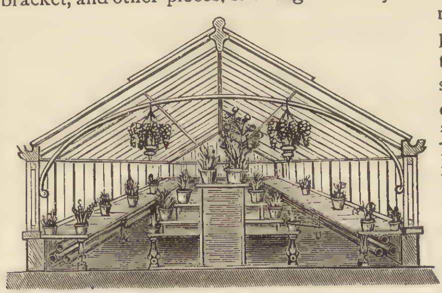


Fig. 58.—*Flues and Shelves.*

The shelving for all houses may be made of open slats or tight matched inch boards. The side shelves are about three feet wide, with a light strip on the edge to retain sand to set pots on. The legs of the shelves should rest on stones or bricks.

The paths are about three feet wide, and best made of grout, a trifle rounding to let off the water. Some are made of slats of wood. In a long lean-to for ornamental purposes, a winding path gives great variety, and keeps small parties out of sight of each other. In the centre of a wide house there may be a stage with shelves rising towards the centre, with an average slope about parallel with the rafters. Some build an eight inch brick wall within the paths and fill the space with earth for plants. The walls must be tied with iron rods running across the bed.

It is impossible to describe a tenth part of all the tasteful fixings seen in houses managed by skillful persons. These consist of brackets, rock work, trellises, rustic seats, grottoes, fountains, aquaria, fancy pots, &c.

Paint and Color.—The heavier parts inside, above the stages, are beautiful when painted pearl white, and the sash a light sky blue. The legs of the stage may rest on a flat stone or a few bricks. The wood-work should be well painted, and all joints are better if put together in green paint.

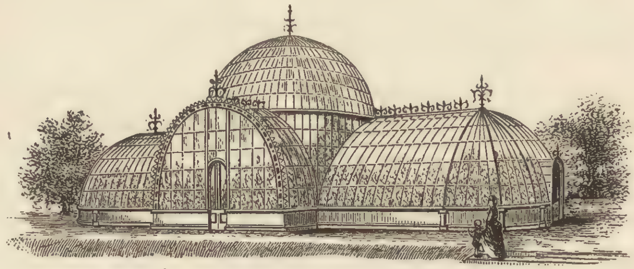


Fig. 59.—*Ornamental English Greenhouse.*

Fig. 59 represents an elaborate and ornamental English greenhouse or conservatory, with a curvilinear roof. It is not so well adapted to the colder winters of this country as one with a lower roof, which would bring the heated air nearer the plants, and require less fuel. One of the best structures of this character is the glass building recently erected at

Fig. 60.—*Greenhouse at Michigan Agricultural College.*

the State Agricultural College at Lansing, Mich., which is represented by fig. 60, taken from a photograph. This greenhouse combines, in an emiment degree, beauty or symmetry of appearance, with the low roof required for our cold winters. It measures 26 feet 10 inches, by 27 feet 6

inches. The portion on the right, in front, is intended more particularly for the exhibition of plants in flower; the other parts for various operations

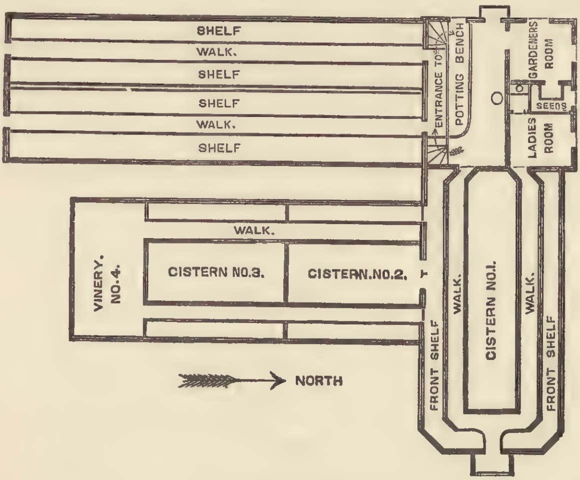


Fig. 61.—*Plan.*

in propagating and culture. The plan, which is excellent, (fig. 61,) explains itself. The cost of this structure was $8,000.

Greenhouses are very apt to have too much wood in them when built by common mechanics. They should be made as light as is consistent with strength. Heavy ornaments are all out of place.

PROPAGATING is mostly done in low, narrow houses, placing the cuttings in sand which is on the stage. As before remarked, the space under the stage or shelf is usually boxed up, to keep the sand much warmer than the air above it, to secure what is called a good bottom heat. This is very essential to good success, and too often overlooked or forgotten. There is nothing new in this fact, as it was well known forty years ago, and perhaps a hundred. Shelves or benches for this purpose are usually made of wood, sometimes of slate. Some prefer vats containing warm water. They are more expensive, and will not last over six or eight years. Good vats can be made of water-lime cement, held in place by boards till sufficiently hardened. A vat of wood may be made as follows: Lay a tight shelf or bench three feet wide along the side of the house, selecting the best pine stuff 1½ inches thick, tongued and grooved, and carefully put together in green paint. Place a piece 2½ or 3 inches wide, one edge up, along the front edge and back edge of the shelf, and across the ends; also one along the middle. The middle strip does not extend quite to the farther end. On these three parallel strips place another tight shelf, with edges 3 inches high, upon

which place 1½ inches of clean sand, to contain the cuttings. This must never get above 70° for most cuttings. Tap the flow pipe and conduct it into the side of the vat near one end. The water, 1½ inches deep, after passing down one side of the vat and back the other, will pass out through another pipe into the return to the boiler. To check the heat, place a little block partially over the upright flow pipe where it enters the vat. If much over 80 feet long, the water gets too cool before leaving the vat. Fifty to sixty feet, or any shorter length, will do. Fig. 62 shows a vat, the ends of the flow pipe, A, and return pipe, B, and the course of the water.

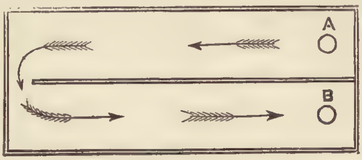


Fig. 62.—*Flow of Water in Vat.*

A Double Span House.—For large establishments, this style of house has been brought to great perfection as far as concerns cost, economy of fuel, ease of management, and the capacity to grow good plants. Nearly all nurserymen and florists seem well satisfied with them. The main features are well given in Henderson's Floriculture. Three houses are placed side by side, in contact, each 11 feet wide by 50 feet to 100 feet long, running north and south, with shed 16 feet wide, for potting and packing, on the north. The walls are hollow, made of bricks or posts of wood set firmly in the ground and cut off evenly about three feet above ground. On these are nailed a 2 by 4 inch scantling, projecting 1½ inches over the post. One foot above the ground is a notch in each post for another horizontal scantling. On these is placed a layer of tarred building paper and another wall of boards, leaving a 4-inch hollow space. A filling of sawdust or tan or shavings is not needed, and may harbor mice. On the plate is nailed a slanting board 8 inches wide. The roof consists entirely of hot-bed sash 3 by 6 feet, set up opposite eaeh other, with the top end fitting into a ridge pole, like fig. 63. Alternate sash are screwed fast at both ends. The other sashes may be raised at one edge for ventilation, and secured by the iron strap previously described. For many purposes it is often convenient to remove all the glass during a portion of the year. The paths are 2 feet wide, leaving the benches 4½ feet on each side, raised on posts over the pipes or flues. If heated by flues, there are two of them for three houses, each running from the furnace next the outside wall of the houses; they cross the south end and run back each side of the centre house.

Fig. 63.

This plan of three houses, side by side, with two furrows, is found to work well in New-York State and in Michigan, even where there is con-

siderable snow. Permanent rafters and sash, with ventilators, fifteen inches wide for half the length of the house are a little cheaper.

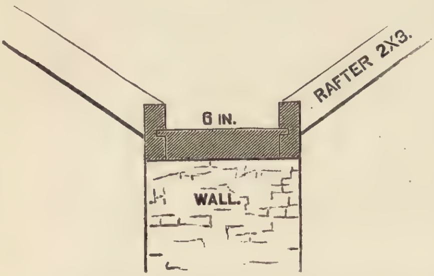


Fig. 64.—*Section of Gutter.*

Fig. 64 shows a section of a gutter or eaves-trough, and the rafter resting upon it. Gutters for the side may be narrower, and supported by brackets.

A rather steep roof, 45°, has some advantages. There is more light, the house is stronger, and there is less drip, but it takes more glass, the temperature is not so even in the higher and lower parts of the house, and higher stages must be made (if the houses are wide) to get the plants near the glass.

A Lean-to is a kind of green-house often used, but the light is all

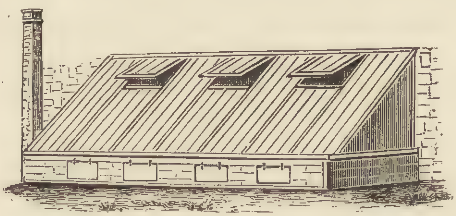


Fig. 65.—*Cheap Lean-to, Heated by Flue.*

from one side, and not so good for the plants unless they are frequently turned around. Fig. 65 shows a cheap one; fig. 66 is the ground plan, and fig. 67 a section.

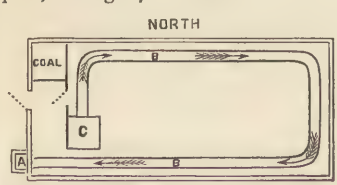


Fig. 66.—*Ground Plan of Lean-to*—A, *chimney*—B B, *flue*—C, *furnace.*

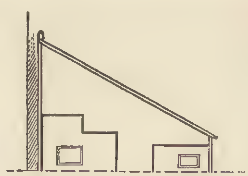


Fig. 67.—*Section of Benches and of Flues under them.*

A neatly constructed greenhouse, attached to a dwelling, and partaking somewhat of the nature of a lean-to. with but little of its disadvantages, is shown in fig. 68.

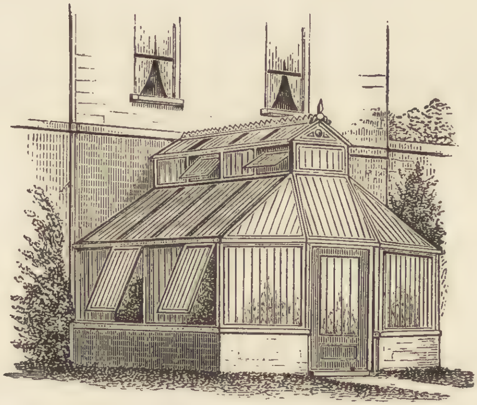


Fig. 68.—*Greenhouse attached to Dwelling.*

A very cheap one, easily managed, may be made as follows: Just beneath a sloping outer cellar door may be placed a few sash and glass. On warm days, or at all times, except nights and very cold weather, the wooden doors may be open. Some plants will do very well in such a place. Fig. 69 represents such a contrivance with the wooden doors omitted; fig. 70 is a cross-section, where *a* is the cellar; *b*, the place where the south cellar wall has been removed; *c*, the standing wall; and *d* the sash.

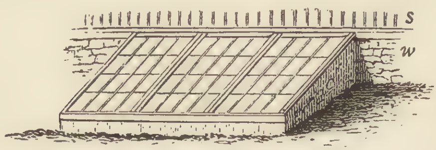


Fig. 69.

The writer knows of something which has given entire satisfaction, on a larger scale, 8 by 18 feet, on the east side of the cellar. It can be entered through the cellar or from the house above. A saddle boiler is used, arched all over with brick, which grows smaller as it becomes a flue and enters a large chimney, which also answers for other fires in the house. It needs very little care. The boiler also has some pipes attached for warming with water. It takes about 2½ cords of 3-foot wood for a year.

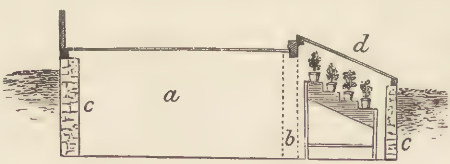


Fig. 70.—*Cross-section.*

A Portable Dwarf Span Roof Greenhouse, for setting over asparagus, rhubarb, grapevines, tomatoes, &c., to keep off frost and retain heat in

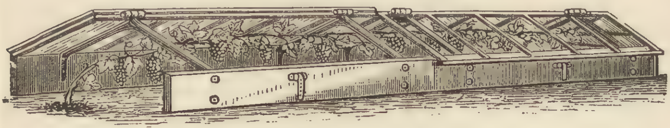


Fig. 71.—*Portable Cover for Low Crops.*

spring or autumn, is shown in fig. 71. Doors on hinges, as shown, may be made to cover the glass quickly in cold weather. The cost is about one dollar per foot, three feet wide.

HEATING APPARATUS.—Steam is now seldom used for heating greenhouses, as it requires more attention, and there is more danger than when warm water is employed. Heat does not circulate until the steam is generated, while water begins to circulate as soon as the temperature rises one degree. Warm water is safest, there is no danger of gas or explosion, the heat is not excessive anywhere, but evenly distributed. There is something injurious and unpleasant about a high heat of flues or iron pipes. The labor of tending fire for warming by water is very little, an item of no small account in a large house. The cost of boiler and pipes is the greatest objection to their use. Water is best for large houses; many prefer brick flues for small ones. The boiler should be large enough to contain a great body of hot coal, and not need hurrying. The flow pipe must come out at the highest point of the boiler. Most builders put up pipes so the flow pipe slowly rises from the boiler to the extreme end, where there is an expansion tank; from here the pipe returns below and parallel with the flow pipe, and enters the lower part of the boiler. Mr. Saunders of Washington, arranges the flow pipe to slowly descend, and the return pipe also, through the whole length. It works well. His reasons for this arrangement are—that after leaving the boiler the water grows colder and heavier, and naturally falls, to make room for the lighter warm water. The fewer turns in the pipe, the better. After many years of experience, Hitchings gives the following rule for the amount of 4-inch pipe to heat a glass house well made: For a temperature of 40° to 45°, with outside at 10° to 15° below zero, we need one foot of pipe to every four feet of glass exposure; for 65° to 70° we need one foot of pipe to every three feet of glass. The boiler should set four to eight feet below the level of the house, though this is not essential with all heaters. The pipes at each joint rest on brick piers carefully made. Houses on low ground may have the pipes descend and then rise to pass under a sill, but this is thought objectionable. For farther details consult almost any catalogue advertising heating apparatus.

E. W. Herendeen of Geneva, N. Y., has furnished for this article a des-

cription of a cheap boiler for heating greenhouses, which is represented by the accompanying figure (fig. 72.) A is the ash-hole; R, an iron ring in which the grate G is placed, and around which the boiler rests. The fire-place F is inside the boiler, which has a water space, W W, around the fire, two to three inches. The boiler is made water-tight at top and bottom. The stovepipe B fits on the upper part. The boiler simply rests on the iron ring R, and is made of sheet copper, by a good tinman. D is the door for putting in coal; H, the flow pipe; C, the return pipe; P, a plug for letting off water. No safety-valve is required, as the water flows out freely—passing out constantly, the boiler being always *full*, as the water is on a higher level than the boiler. Any ingenious tinner can make one of these at a cost of $25 to $40, according to size. Mr. Herendeen has used this boiler for several years for houses of moderate size. The copper being thin, the heat passes readily through it from the burning coal, of which about two tons per month are required for a medium-sized propagating house. As the water is never over 150°, the copper does not burn out, and it will last an indefinite number of years.

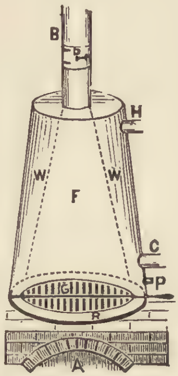


Fig. 72.

FLUES have long been used. They are very simple in construction. The bottom is made of bricks or tiles, a foot one way, held up on bricks or stones to allow the heat to escape; the sides are made of two or three bricks above each other on edge; and the top is covered with tiles. The flue should gradually rise for its whole length. The mortar should be thin and the bricks damp, so that no joints will be left for pointing. Well puddled clay makes a very good mortar. Tiles a foot square often have a notch along one edge to overlap a notch in the previous tile. The best way to lay them is shown in fig. 73, where the little furrow on top should be filled with mortar. A brick furnace may be made and set two or three feet below the flues. The door should be just outside the glass house and open into the shed near a coal bin. If for coal, make for a moderate sized house, a furnace 1½ feet wide, 2½ feet high at the centre of the arch, and 2 feet deep, and lined with fire bricks. If for wood, it must be longer and some larger, depending on the size of the house. The arch needs an iron front, with two doors, one for fuel and one for ashes. Iron grates to hold up the fuel are desirable. It is generally thought impracticable to make flues work well if much over 120 feet in length. On the flue should be placed several large, long pans of water, to afford moisture. Instead of bricks for the entire flue, after about 20 feet, flues are nicer and better made of large cement drain pipe; they crack and give out heat too freely

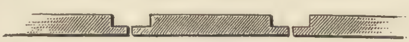


Fig. 73.

for placing nearer the furnace. A *saddle boiler* is sometimes used, uniting the heating by flues with that by water. It is a very economical and satisfactory way of heating small houses.

Long Flues Buried in the Ground.—The writer knows of a double span house, 100 by 30 feet, and 12 feet for the extreme height, all above ground. The glazing is not very tight. The house is kept at a minimum temperature at night of 45°. Inside the house, near one end, at the side, is a brick furnace 2 or 3 feet below the flue, and covered with coarse sand and gravel. The flue on that side of the house is horizontal, and buried below the ground level so that there is 3 inches of gravel above tbe top. At the end farthest from the furnace the flue rises about a foot, runs across the end and back the other side on a level, resting on the ground; thence into a chimney, which is a trifle over 12 feet high. The whole flue is a little over 200 feet long. I have asked many a man who had been used to greenhouses all his life, how such an arrangement would work. Every one said it would fail. In the winter of 1873, a very severe one, the only fuel used was about 150 bushels of coke and two cords of wood, the cost of coke, $15, and of all the wood, $8. The owner has curtains inside, so arranged that he can, in five minutes completely screen the house, or in the same time expose the plants to the light. This screen is drawn over every night. He prefers green beech wood for fuel.

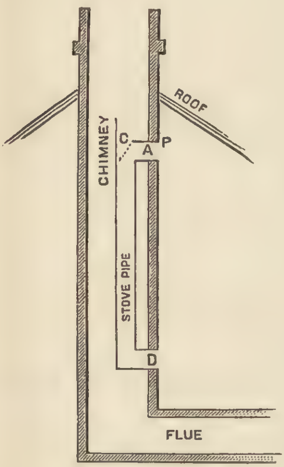


Fig. 74.

The warm bed of sand and the curtains obviate the necessity of any firing up during the night. To start the draught when the long flue is cold he has the following device: Inside the chimney is a 6-inch stovepipe, 8 feet long, which has an elbow at each end, each passing through the side of the chimney and opening into the house. At A, in fig. 74, is a damper to stop the pipe, and open it at C. This is done when wishing to aid the draft. He then builds a light fire of shavings or kindling wood, or even a lamp set in, at D. This warms the air in the chimney, and starts the draught at once. After it is once started the damper is changed, so that as cold air goes in at D it comes out warm at P if there is any heat in the air passing from the flue and up the chimney. It saves heat.

The rapidly increasing demand for greenhouses is one of the most promising signs of the times. It indicates culture and refinement. There is something truly ennobling in caring for ornamental plants, which are

raised for the love of them, without any reference to the money they will bring, while growing them for money is one of the most honorable of occupations. What a contrast between growing roses and lilies, camellias and carnations, and distilling or selling intoxicating drinks!

CRANBERRY CULTURE IN NEW-JERSEY.

By E. W. Crane, Caldwell, New-Jersey.*

Species and Varieties.

THE CRANBERRY is found growing wild in many parts of the world. It belongs to the Heath family, and the genus *Vaccinium.* The European *Vaccinium oxycoccus*, a small, mottled berry, grows in some parts of England, Scotland, Germany and Sweden, and on the steppes of Russia; the same species is found in different portions of the United States, but we do not hear that it has been successfully cultivated either here or abroad.

The American cranberry (*Vaccinium macrocarpon*) is found in most or all of our States, from Maine to the Carolinas, in Oregon and Washington territories at the northwest, in the British Possessions, and even in Alaska. It is much larger than the European, and of greatly superior flavor,—also generally of a darker and brighter color when mature; while growing it is of a light green, which changes in ripening to a light or dark red, or crimson, and sometimes to a mottled color, the berry being from one-fourth to one inch or more in diameter. It blossoms in June, and the fruit ripens in September and October. The runners of the vines are from one to eight or more feet in length, and with small oblong leaves. It may properly be called an evergreen, though the leaves turn to a brownish hue during the fall, especially when the vines have been cultivated, and set in sand.

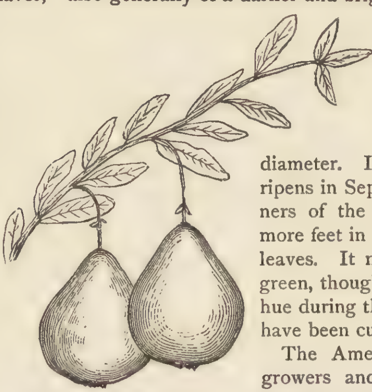


Fig. 75.—*Bell Cranberry.*

The American cranberry is divided by growers and writers on this subject, into three leading varieties.

1st. The Bell Cranberry, (fig. 75,) so called because of its fancied resemblance in shape to a bell.

* The basis of this article was first published in the Transactions of the New-Jersey Agricultural Society, but it has since been specially revised and added to, and all the illustrations prepared, expressly for the Illustrated Annual Register.

2d. The Bugle cranberry (fig. 76) somewhat resembles a bugle head; is elongated, and approaches an oval in shape.

Fig. 76.—*Bugle Cranberry.*

3d. The Cherry cranberry (fig. 77) is so called from its similarity in shape, size and color to the cherry.

These varieties too run together, and produce intermediate ones. The vines also differ; some are of a *shorter growth* than others, and apparently produce more fruit and less vine; these are of course to be preferred. Until recently, little attention has been given this subject, it being popularly supposed that the wild nature of the cranberry could not be successfully *tamed* to any great extent, for which there has been some foundation in fact; but experiments are now in progress which will doubtless add to our knowledge on this point, as well as to others of interest in regard to cultivating the fruit.

Fig. 77.—*Cherry Cranberry.*

No other species which we know is so successfully cultivated anywhere, as is this in the United States, between 38° and 45° north latitude—though it is said that this limit may be extended several degrees southward in the Alleghanian ranges; and also several northward, on our western coast, on account of the peculiar influence of the ocean currents upon the climate. A medium between these latitudes is preferable, though there are but comparatively few localities where all the requisites of soil, sand, water and climate are to be found; and a smaller acreage of land is better adapted to their growth than to almost any other fruit. These requisites, however, are believed by careful observers to exist in greater perfection in Southern New-Jersey than in any other State or part of the world.

EARLY GROWERS.

The first attempts to cultivate this fruit, of which we have any knowledge, were made by Captain Henry Hall of Dennis, Mass., on Cape Cod, in the year 1812. He sold his first crops for from $1 to $1.25 per bushel, and the original vines yielded a fair crop in 1873, as they have hardly ever failed

to do since they first came into bearing. Many difficulties, however, were encountered, and it was nearly forty years before the cranberry was generally cultivated on "the Cape," which locality for a time almost entirely supplied our markets.

John Webb of Jackson township, Ocean county, was doubtless the first successful cultivator in New-Jersey. He commenced his experiments about the year 1843, having only the slight information from newspapers coming occasionally into his hands, that cranberries had been cultivated on Cape Cod with satisfactory results. Living as he did, in an isolated place, (a few miles from Cassville,) with little education, and no capital, he was embarrassed with many difficulties. Still he persevered, until at length his enterprise was crowned with the success it so richly deserved, and which, as his work was very rudely done, was indeed surprising.

Soils and Localities.

The best localities for the growth of the cranberry are peat or muck bottoms, with adjoining banks of pure sand, (for covering the plantation before the vines are set,) and so situated that they can be completely flowed by living streams during the winter, as well as thoroughly drained at other seasons of the year. Many growers have a decided preference for cedar swamps, and (although other bottoms are sometimes perhaps equally as good) they are considered, when favorably located, as rather the surest, though more expensive to work. Cranberries grow well also on good "savannas," but not so abundantly, nor do they last so long as on muck bottoms.

The recommendation of the late Prof. Agassiz, to avoid the drift formation, or that portion of it consisting of rocks not in place, gravel, clay, loam, &c., has been found correct in practice. Many experiments have been made on land of this kind, but nearly all of them have proved failures.

Dr. Cook, New-Jersey State Geologist, states that even muddy water running over the vines is extremely detrimental, if not fatal, to their growth.

Preparation of Soils.

In preparing a plantation, the surface must first be cleared of the wood, timber or brush; then it must be "turfed,"—that is, the surface soil and roots must be taken off with a hoe made for that purpose. The next step is to ditch it, by clearing out the main water-course, and digging side drains running into it—generally in deep, bottom lands, about one and a half or two rods apart, but the distance should be varied in accordance with the nature of the ground. The turf removed is used for leveling up low places where needed, so that the surface may be slightly rounded between

Fig. 78.—*Section of Ditches.*

the side drains, fig. 78. It is also used for building the dam, which is constructed with two walls of turf, filled in with sand, a ditch having first

been cut between them to the sand beneath; the solid filling makes it water-tight, (fig. 79.)

After turfing and ditching, muck bottoms must be sanded to the depth of from four to six inches with *pure sand*, without mixture of clay or loam, and it should be taken from a sufficient depth below the surface to avoid seeds. The silex imparted to the vine from the sand stiffens it, materially promotes its productiveness, and tends also to prevent the growth of weeds. Many experiments have been made to ascertain the proper depth to which the sand should be applied; where little or none is used the vines grow long and slender, and do not fruit so well as when sanded. While some have thought two inches sufficient, others have tried a thickness of twelve inches or more, and with good results—though with this amount the vines make a slower growth, on account of the length of time required for the rootlets to reach the peat beneath, from which they draw their support.

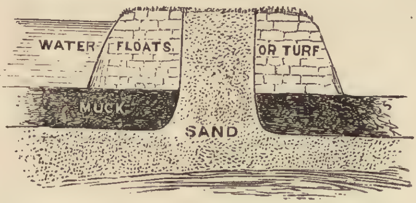


Fig. 79.—*Section of Float or Turf Dam, showing the Filling of Sand.*

Most cultivators, however, have concluded that the above depth (from four to six inches) is about right for bottom lands when prepared, though it may be varied somewhat, according to the character of the soil—deep muck requiring most—and that re-sanding every few years with a layer of from one to two inches, is preferable to using a much larger quantity at first.

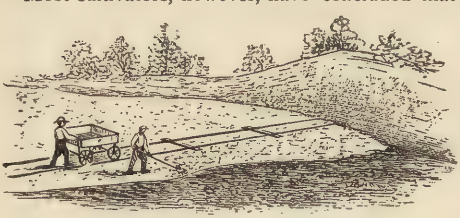


Fig. 80.—*Portable Tracks, and Mode of Sanding.*

The sand is generally obtained in the banks adjoining the edges of the the swamps, from which it is brought, if a short distance, on wheelbarrows, if a long one, by means of a dump car and portable track (fig. 80.) In some localities, however, it can be more easily obtained by sinking

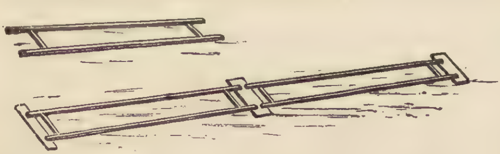


Fig. 81.—*Portable Track, the Sections resting at the ends on short pieces of plank.*

pits to the layer beneath the muck—when the latter is not too deep—from which it is thrown up and spread over the surface. The pits are filled with the turf, &c., allowed to settle, and then covered with sand. Dr. Goodell informed me that this plan was successfully employed at Cranberry Park.

Setting the Plants.

After sanding, the vines are set in rows about twenty inches apart, and but a moderate quantity of vine should be used for each hill. This is the usual method, though the distance is often varied either way. Mr. D. R. Gowdy of West Creek, N. J., one of the original cultivators, has, from recent experiments, concluded that the vines should not be set over a foot apart, and that the additional cost of the vines, &c., will be more than paid by earlier and larger crops, as well as by the matting of the vines in much less than the usual time, which keeps down other vegetation, and saves labor and expense in cleaning.

Some have preferred that the distance should be three feet apart—and even more—claiming as advantages, that the vines can be more easily cultivated, if desired, with the aid of a horse and plow or cultivator, and that a larger growth of *new vines* will be obtained.

Mr. N. H. Bishop of Manahawkin, N. J., has also successfully adopted the method of layering the vines, or placing them in furrows in the sand, with which they are entirely covered to the depth of about one and a half inches. Vines grow finely by this method, but great care must be taken to keep them moist. Wild vines have generally been preferred to cultivated ones for setting, from the fact that they grow more vigorously at first, especially if the season is a very dry one. Cultivated vines are, however, now often chosen by those wishing to secure certain varieties which they have been better able to select from bearing plantations, though it is extremely difficult to separate varieties and thus get them pure.

"Savanna" land—which is the name given to land lying between upland and swamp, composed of a mixture of peat and sand—can be plowed, and does not need sanding; this is a great saving of expense, but so large crops cannot be expected as from bottom lands. Where possible on land of this kind, the turf not needed for the dam should be plowed or dug under the sand, as it is often the richest part of the soil, and is well adapted to the growth of the plant.

The surplus turf was formerly used in constructing "float (or turf) fences," but experience has shown this to be a bad practice, as they furnish harbors for worms, grasshoppers, &c., which feed upon the vines and fruit.

Flowing.—Plantations should be well flowed from December until May. The water fertilizes the vines, protects them from frost, and is the only reliable remedy known for the vine worm, which is one of our worst enemies. It is thought that the warmth of the water, where held on the vines until the 10th or 15th of May, destroys the eggs deposited on the

eaves the previous year; hence the advantages not only of *late* but *thorough* flowing, as the portions not flowed often constitute a hatching ground for the worms, from which they spread to the adjoining vines, though it has been noticed that they apparently prefer not to go much beyond the water line if they can find sufficient vines that have not been flowed.

Much has been written at times in regard to the cultivation of *upland cranberries*, or the swamp vines planted on upland, but I know of none who have succeeded. The cranberry is natural to low and moist peat land, and on such it should be grown, for even high "savannas" are now considered objectionable.

Insect Enemies.

The cranberry grower frequently meets other foes, some of which I will briefly notice.

The fruit worm, although not so troublesome as the vine or fire worm above mentioned, sometimes does much damage. They work less on moist than on dry ground, and the best remedy of which I have heard, is ro raise the water a little in the ditches, if possible, where they may make their appearance.

Grasshoppers and crickets also occasionally commit serious depredations on the growing crop. Some growers have tried the plan of keeping flocks of turkeys on vines infested with them, and with good results, though others have not succeeded with this method. Mr. Charles L. Holman of Bricksburg, N.J., states that the ravages of an army of crickets on a plantation near his place. during the summer of 1873, were effectually stayed by the frequent visits of a large number of crows from the neighboring woods, which is a fact worthy of mention, and should prevent the destruction of these not generally popular birds, in the vicinity of cranberry plantations. It is also thought that the English sparrow may prove useful in destroying worms and insects, and probably experiments will be made with them during the coming season.

As grass, bushes and turf fences afford hiding places for all these depredators, they should be removed, not only from the plantation itself, but from the land bordering on it, for a distance of several rods on each side. Whortleberry bushes are especially objectionable, as it is said that their leaves are the natural food of the vine worm.

Protection from Fires—Weeds.—It is also a protection against the fires that often rage in "the Pines," to have the edges of the adjoining grounds cleared, and better still, if the location is a dangerous one, to have them floated, so that sand may be easily obtained with shovels, as that is the most effective agent in staying their progress.

Many crops have been either partially or wholly lost during the past two or three seasons, by "scald," (or a rotting of the fruit just before the ripening season,) the causes of which are as yet but imperfectly understood, though from investigations now in progress it is hoped that much will be learned in regard to it during the coming season.

Young vines, however, are more apt to be affected than older ones, and it seems evident that plantations having thorough drainage and a free circulation of air are less liable to it than others where these conditions are not found.

It is best to keep the ground free from weeds and grass for two or three years after the vines are set; the ditches should also be cleaned of the sand, &c., which frequently runs into them. This costs usually from $10 to $20 a year per acre, but if carefully done, on well located and properly prepared land, the expense is afterwards, as a general thing, comparatively slight, as the vines should by that time have possession of the ground, and prevent to a great extent the growth of other vegetation—and with an occasional re-sanding to the depth of from one to two inches, which produces a new growth, the plantation will last a great number of years—in fact indefinitely, as the original vines set on Cape Cod more than sixty years ago, produced a fair crop in the fall of 1873.

Some growers, especially on "the Cape," occasionally mow off the old vines, in order to obtain a new and vigorous growth, and savanna plantations have been renewed by carefully plowing them up, in which case the vines start between the furrows, and spread over the whole surface. When either of the last mentioned methods are practiced, there is generally a loss of one or two crops, which there need not be by the first, if the work has not been too long delayed, so that there is a large growth of old wood. It may be said, however, in favor of *mowing*, that where the vines are good, and there is a demand for them for setting, they will often sell for as much as a crop of fruit, or perhaps more.

Frosts.—Late spring and early fall frosts sometimes seriously injure the crop. The former may, however, generally be avoided by late flowing, but the water should not be held on too long, as the growth may thereby be kept back so much that the fruit will be damaged by an early fall frost, which it is more likely to resist if ripe. The fruit of sanded vines is less liable to frost than that of natural meadows which have not been sanded, and although in some localities the latter bear often very well, the crop is more uncertain, as well as smaller.

Fertilizers.

Some plantations are over-run with moss, which prevents the runners from taking root. It is sometimes brought in by burning turf or brush on the land when prepared, which should be avoided—especially on savanna ground, not requiring sand. The best remedies that I know of are applications of sand and plaster of Paris, and ditching.

Plaster is also a very good fertilizer for savanna lands that need stimulating. Good bottom lands need no fertilizing, but quite a number of experiments have been tried with different articles on lighter lands. Probably nothing better has been found than muck, which contains all the elements needed for the growth of the vine and fruit, except those obtained from water, sand and air; where applied, however, it should always be covered

with sand, as berries grown on muck without such covering seem more apt to *scald* than others.

Plaster and fine ground bone dust have each been used with success, and will doubtless be valuable for lands where muck cannot be readily obtained. It is also thought by some growers, that a moderate application of Peruvian guano soon after the *blossoming season*, will not only be of great service as a fertilizer, but in protecting the vines from worms and insects. Great care should, however, be exercised in the use of artificial fertilizers, as it has been observed that on vines which have been overstimulated, although the quantity of fruit was greatly increased, the berries were large, hollow and watery, and the vines bore little or nothing again for several years.

An analysis of the fruit made some time since by Prof. Horsford of Cambridge, also showed that but little fertilizing was needed for its growth, less than one-fifth of one per cent. being found in the ash, as inorganic matter derived from the soil—all the rest from water and the air.

Gathering the Fruit, and Shipping.

The berries ripen in September and October. The "picking season" generally commences about the 10th or 15th of September, lasts from four to six weeks, and furnishes employment to thousands of women, girls, boys, and sometimes men. A good plantation at this season, with its rich load of fruit, presents a beautiful as well as a lively scene. Good workers will generally gather about three bushels per day, though some have picked as high as four or five, aud even more. Many of the younger ones, however, will not exceed one bushel, so that in a force of fifty or one hundred they generally average in good work about two bushels per day. The system now most in favor is the use of peck boxes or baskets, for which peck tickets are given, when filled, by the overseer. (Fig. 82 is a peck picking box, the dotted lines showing inside marks for half peck and peck; fig. 83, peck picking basket.) Four of these are exchanged for one bushel ticket, and the bushel tickets are again exchanged for fives or tens. No book is required, and the tickets represent the money, for which they are generally taken at the neighboring stores. At the close of the work the tickets are usually redeemed with as little delay as possible. The usual price paid for picking is fifty cents per bushel, though in some places but forty cents is paid.

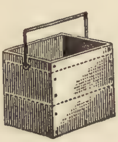


Fig. 82.

Fig. 83.

Considerable money has been spent in making and experimenting with machinery, and though nothing entirely satisfactory has been produced, it has been demonstrated to the satisfaction of one or two of the inventors that, in case pickers should become very scarce, or demand extortionate wages, or berries should become extremely plentiful, a machine may be made to cull them, though not quite clean; but it is thought that for the

present, or as long as people can readily be obtained to pick them for forty or fifty cents per bushel, it is not worth while to experiment further with the machinery. The berries are generally emptied from the pickers' baskets or boxes into crates or barrels, in which they are carted to the place where stored. For storing, a dry, well ventilated cellar is to be preferred, and crates are better than barrels, because more conveniently filled, and if strips are placed between them, as they always should be, a good opportunity is given for the circulation of air, and it is thought that they they will keep better.

MARKETS.—The berries are shipped principally to the great cranberry markets of New-York and Philadelphia, many of them without re-sorting, though the most careful growers now re-sort and screen their fruit before shipment, if kept long after picking. It should also be carefully looked over when picked, and the packages well filled just before forwarding, both to give satisfactory measure, and because they carry much better in full packages.

The best demand has existed in our markets for dark colored fruit, which has heretofore brought higher prices than the light, as it was thought to be of better quality, and to keep better. Experience, however, shows that while this reasoning holds good with fruit which is light-colored because *unripe*, it does not with that which is *fully ripened*, and *still of light color*, and which is frequently met with (as are ripe apples of light color.) Fruit of this kind generally keeps better than the "high-colored," is highly prized by those acquainted with it for the beautiful light sauce to be made from it, and as its value becomes known, brings an equal price, if not higher, than the dark colored. As this will doubtless be new to many, I will state in corroboration that it is the experience, not only of myself and many other growers, but also of a large grocery house having one of the best first-class retail trades in this State.

Although the production of cranberries has increased enormously within the past few years, the demand seems, as a general thing, to increase with the supply, and prices are better now than when the cultivation commenced, either in this State or on "the Cape." During the earlier years of cultivation, prices ranged from $1 to $2.50 per bushel; for several years past they have been generally from $3 to $5; occasionally a little lower, and sometimes higher. For a short time, a few years since, they were sold as high as $45 per barrel.

As large tracts of land have been prepared and set with cranberries, which have not yet come into bearing, it is quite possible that there may be times, within the next few years, especially with a large crop at the West, when prices will be very low. That of itself, however, will have a tendency to increase the consumption of them, as perhaps not one-half the inhabitants of the United States ever tasted a cranberry, many of whom would become purchasers at extremely low prices, and probably would continue to be, even if prices should advance a little, for the fruit is generally

a favorite, and considered very healthful. Its valuable antiseptic and antiscorbutic properties are well known. It is also highly recommended by the medical faculty for various diseases. A wine made from it by Robbins De Bow of Cassville, Ocean Co., N. J., and exhibited at a late fair of the society, attracted much attention. Though not adapted for use as a beverage, it is believed to possess valuable medicinal qualities.

ASSOCIATION—STANDARD PACKAGES.—The growers of New-Jersey have within the past year formed an organization called the "New-Jersey Cranberry Growers' Association," of which Rev. Dr. John H. Brakeley of Bordentown, is president, and Hon. Whitfield S. Johnson of Trenton, secretary. Its object is to advance the interests of all engaged in cultivating cranberries in this State, by obtaining statistics and information of the crop of this and other States from time to time, to secure the use of uniform packages, to enlarge the market both at home and abroad, &c. It already numbers about one hundred members. Three very interesting and successful meetings have been held during the past year, and a record of their proceedings published in supplements to the Bricksburg Times,—and the results are already apparent. One of the first acts of the Association was the establishment of a system of standard packages, in which a large part of last year's crop was shipped. This was an important step in advance, and was taken and carried out with a unanimity that surprised its most earnest friends. Formerly the berries were shipped in barrels of different sizes, and in crates varying in size from 27 quarts to 32 quarts, those using the former size claiming to get just as much for them as those who used the latter and furnished a full bushel. The consequence was that dealers generally considered that none of the crates held a bushel, and naturally were unwilling to pay the price of a bushel for them.

The standard packages are *barrel*, *bushel* and *peck*. The barrel adopted is the same as the standard barrel of the Cape Cod Cranberry Growers' Association, which secures uniformity where their fruit comes into competition with ours. It is made of 28½ inch staves, so jointed as to give a bilge of 7½ inches; heads, 16⅝ inches

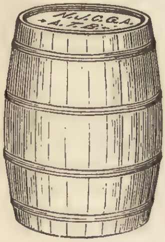


Fig. 84.—*Standard Barrel.*

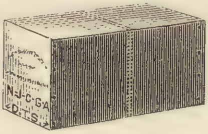


Fig. 85.—*Bushel Crate.*

Fig. 86.—*Peck Crate.*

in diameter, and so set in the staves as to leave the inside measurement of barrel between the heads 25⅝ inches. The finished barrel is about 28 inches in height, (fig. 84,) and contains three bushels rounded measure. The bushel crate measures 8⅝ inches by 12 inches by 22 inches inside, exclusive of the middle partition, contains 2,211 cubic inches, and holds one bushel, rounded measure—just one-third as much as the barrel, (fig. 85.)

The peck crate or box measures 6 inches by 8⅝ inches by 11 inches, contains 552¾ cubic inches, and has one-quarter the capacity of the bushel box, (fig. 86.) The "round" in all consists of 3½ quarts per bushel, in addition to "struck" measure. The packages hold just the quantities mentioned when *well filled*, as packages of cranberries should always be for shipping.

The standard packages are marked with the brand of the association, which consists of its initials, with those of the manufacturer underneath in smaller letters, and between two arrow heads. Barrel manufacturers are also allowed to use a steel stamp for striking in the heads, instead of branding. They are furnished by the standard measure committee of the association, only to manufacturers who agree to use them on none but standard packages, directions for making which are furnished by the committee. As no brand is furnished without the manufacturers' initials, it is made an easy matter to trace fraud in size, if any should be attempted, to its source, especially, as growers and dealers have been furnished with the sizes ; and it is made the duty of the committee to expose any irregularities coming to their notice, both through the press and by circulars sent to parties interested. This measure meets the general approval of both growers and dealers, has been strongly endorsed by the State inspector of weights and measures, and will doubtless speedily come into general use.

Statistics.

It is very difficult at present to obtain accurate statistics as to acreage, amount of crop, &c., though it is hoped that through the aid of the association we shall, in a year or two, be able to do so. Although I have made special efforts to get them, I can present only *estimates*, and give them as such from the best information I can obtain :

No. acres bearing cranberry land in the State, ...	4,000	acres.
do. cultivated do. do. do. not yet in bearing...	3,000	do.
do. wild, do. do. do. .... 10,000 to	12,000	do.
Crop of 1873, ...	125,000	bush.

Average price of crop of 1873, $2.50 to $2.75 per bush.

The only really accurate statistics that I have in regard to the last crop, are the receipts in New-York of the New-Jersey Southern railroad, from September 22 to December 31, 1873, which were 45,252 bushels. These figures were kindly furnished by Mr. N. R. French of 180 Reade-street, New-York.*

Cost and Value.—The cost of cranberry land, and of the labor of preparing and setting it with vines, varies considerably, according to the location and quality of the land. Perhaps $25 per acre for good savanna land, and $150 per acre for the necessary work—and $50 per acre for good bottom land, and $300 per acre for the work, (after which the yearly expense for attention should be but slight,) are about average prices, (though some

* Since the above was written, Mr. French has been appointed Statistician to the Association.

savanna lands have been sold as low as $5 or $10 per acre, and the work has not probably cost over $100, while cedar swamps have been sold for $200 per acre, and the cost of preparation has been as high as $700 or $800,) with from $10 to $20 per acre per year for attention for two or three years after the vines are set. But little fruit can be expected until the vines are three or four years of age, when they should begin to bear paying crops, which should increase annually for two or three years, when they are said to be of full bearing age, and with the attentions mentioned, on well selected and properly prepared land, will last indefinitely.

At four years of age good plantations have been said to have an average value of $1,000 per acre, though the price varies, of course, according to the demand and the supply, location, quality, etc. Some owners have refused $2,000 per acre for their lands, while others could not sell for the original cost.

An average of 100 bushels per acre for a plantation, though not an immense yield, is considered a very good one. Many have exceeded it, but many more have fallen below, and perhaps an average crop for all classes of land, in a good season, would not exceed 50 bushels to 75 bushels per acre. Probably the best crop on record for one acre, was that of one acre of the celebrated Oxycoccus plantation of Mr. N. H. Bishop of Manahawkin, N. J., in 1872, from which was sold 423 bushels, for $1,809, gross, though parts of acres have yielded at higher rates than the above. A few rods of one of our own plantations yielded, during the season of 1873, at the rate of over 700 bushels per acre, and larger rates still are reported from one or two rods; but these, of course, are exceptional cases. Single crops, however, have often paid 50 per cent., and even more, on the original cost. Some, however, think that such profits will not again be realized, and it cannot be denied that many have lost money in the business. Some plantations have proved failures, and others doubtless will do so, though most of them occur on poorly selected land, on which the work has, perhaps, been imperfectly done at first and afterwards neglected. To attain success, experience and close attention to business is necessary, and so much patience that cultivators often think their profits dearly earned when successful.

No ground should be prepared for cranberries unless it can be completely flowed, and those engaging in the business should either have a practical knowledge of it themselves, and give it their personal attention, or first secure the services of some one who has, for the capital invested is frequently lost through either ignorance or carelessness.

Growers have had to encounter many difficulties during the last few years, some of which have been very discouraging, still I can see no reason why the business should not be depended on to pay, as a general thing, after the vines get into full bearing, at least 25 to 30 per cent., where everything has been well done and on first-class land; it certainly should, if the present efforts to extend the market prove successful.

Local Advantages—Foreign Trade.

New-Jersey, without doubt, possesses advantages over every other cranberry growing section of the United States. We are, in a great measure, exempt from the early and late frosts to which the plantations of Cape Cod in the East, and Wisconsin and Michigan in the West are subject. The lands of the former locality are also already well occupied, and although there are still large tracts of cranberry lands in the Western States named, which can be prepared with much less expense than ours, they are not only, as above mentioned, much more liable to frost, but the peat being fibrous and undecomposed at first, gradually decomposes after being drained, and produces a rank growth of vines, which there is generally no *sand* to check, so that the fruit-producing power of the plant is lessened, and gradually decreases.

The western plantations are also troubled with one or two kinds of weeds, which it seems almost, if not quite, impossible to destroy. The crop there is irregular, but still it is sometimes quite large ; hence it is the more important that we have the foreign outlet for our crops, which we are now endeavoring to obtain, and for which the prospect seems encouraging.

But from the reasons just stated, as well as from our peculiarly advantageous position between and with such close proximity to two great markets, I think that New-Jersey must in the future, as in the past, continue to occupy the front rank in the production of this fruit.

In conclusion, I wish to acknowledge my indebtedness for facts and favors in the preparation of this paper, to F. M. Todd of Bricksburg, N. J., Geo. F. Miller of Hammonton, N. J., James G. Gowdy of Tom's River, N. J., D. L. Platt of Jacobstown, N. J., Capt. William Crowell of Dennis, Mass., Eastwood's "Cranberry Culture," Reports of the Department of Agriculture, and to the recent and valuable work on the subject prepared by J. J. White of New Lisbon, Burlington Co., N. J., (from whom I have also received other interesting information.) I am also under obligations to the officers of the New-Jersey Cranberry Grower's Association, and others, whose names have been mentioned in different parts of this paper.

As hardly any fruit is more readily cooked than the cranberry, and perhaps none is more easily spoiled by improper cooking, I attach herewith a copy of the receipts prepared by the Foreign Trade Committee, with the aid of the most experienced cranberry cooks, to accompany their shipments to England. Much care was taken in their preparation, and it is hoped they will be found useful for home as well as foreign use.

Keeping Cranberries.—Select sound berries, and store in crates or shallow bins, or spread on floors, not more than eight or ten inches in depth, where the direct rays of the sun cannot affect them. A dry, well ventilated room or cellar is best, and the temperature should be kept as even as possible. Damp cellars and hot rooms should be avoided. In this way the fruit will keep a long time.

Receipts for Cooking Cranberries.

Preliminary to the subjoined receipts, it may be remarked—to save repetition—that very soft berries should first be removed, and those remaining thoroughly washed, after which they should be placed in scalding water for about two minutes, and then taken out; this removes a portion of the acidity, and a little less sugar will be required.

White sugar (granulated is best) should be used, and not too much water; the proportions given of each, it is thought, will suit the majority of tastes, but when otherwise, the quantities can be made larger or smaller, though in using sugar too freely, the distinctive *cranberry flavor* will be partially lost; some may prefer one pound of sugar where the amount specified is three-quarters, but probably others will be better pleased with less, perhaps with half a pound—especially for *dinner sauce*—which makes the preparation very palatable, and has the advantage of economy; but when desired to keep a long time without canning or sealing, a larger quantity should be used. On account of the acidity of the fruit it is preferable, though not positively necessary, to use porcelain-lined cooking utensils.

Cranberry Sauce is the great American cranberry dish, and the most popular one for general use, either for dinner or tea. As a relish with game, poultry and meats of all kinds, it is unequaled. To every pound of fruit add three-quarters of a pound of sugar and half a pint of water. Stew over a moderate but steady fire. Be careful to *cover* and *not* to *stir* the fruit, but occasionally shake the vessel, or remove to a gentler heat, if in danger of sticking or burning, If attention to these particulars be given, the berries will retain, to a considerable extent, their shape, which is desirable, and adds greatly to their appearance on the table. Boil from five to seven minutes, when they should be removed from the fire, turned into a deep dish, and set aside to cool. If to keep, they can be put up at once in air-tight jars.

Strained Sauce.—One and a half pounds of fruit should be stewed in one pint of water for ten or twelve minutes, or until quite soft, then strained through a colander or fine wire sieve, and three-quarters of a pound of sugar thoroughly stirred into the pulp thus obtained, when, after cooling, it is ready for use.

Pies and Tarts may be made from either of the above preparations, no upper crust being necessary, except, if preferred, in the shape of narrow crossed strips.

Covered Cranberry Pies—which, where known, are generally considered superior to those above mentioned—may be made as follows: Make an upper as well as an under crust, completely encasing the berries, which should be put in *raw*, with a quantity of water equal to about one-quarter their bulk, and sugar in the proportion of three-quarters of a pound to one pound of fruit, care being taken to sprinkle it well around the edge;

also, if desired, sift a little wheat flour over them to thicken the pulp. Bake same as an apple pie, and eat hot.

CRANBERRY JELLY.—To each pound of fruit add half a pint of water; after the berries become very soft by cooking, strain through a bag, and add one pound of sugar for every pint of juice. Boil and skim until jelly is produced, which can be tested by occasionally dropping a little in cold water; when it falls to the bottom without mingling with the water, the jelly is done, and should be taken from the fire. Pour while warm into glasses or moulds (having first rinsed them with cold water to prevent sticking) and set in a cool room to harden.

Another and simpler method, which produces beautiful jelly, and is preferred by many, though it will not keep a long time, is to add the sugar to the juice without further boiling, by sprinkling and thoroughly stirring it in. If the above quantity of sugar should not make it quite stiff enough, add a little more, and after pouring out, let it stand several hours to harden.

PRESERVED CRANBERRIES.—Dissolve three-quarters of a pound of sugar in half a pint of water, and, after bringing to a boil, add one pound of light or cherry-colored berries, (not allowing them to be over two inches in depth on the bottom of the kettle, which should be covered) and cook until they begin to break, then remove them with a strainer to a deep jar or dish; let the syrup remain three or four minutes longer, and then pour it over the berries, which can be set aside for immediate use, or sealed up in glass jars, as desired.

SWEET PICKLED CRANBERRIES.—Prepare the large berries by piercing a few holes in each with a large needle; this will allow the pickle to enter the fruit. To a pound of berries add half a pound of sugar dissolved in a quarter of a pint of vinegar. Cover the vessel, and cook from eight to ten minutes, then remove them and continue boiling the pickle until it thickens; then pour it over the berries, adding spices to suit the taste.

AMERICAN CRANBERRIES ABROAD.—The following remarks are condensed from the London Field of Feb. 14, 1874:

"We have received a box of American cranberries from the New-Jersey Cranberry Growers' Association. They are much larger and finer than those we are accustomed to see, being, we believe, the produce of the *Oxycoccus macrocarpus*, and not of the species indigenous to Europe, namely, the *Oxycoccus palustris*. They were sent in small boxes containing about six or seven pounds each, and were not bruised or damaged by the transit.

"The production of cranberries in the United States has increased within the last few years to a surprising extent. A capital of a million dollars is successfully employed in their growth, and the annual yield is estimated to be about one hundred thousand barrels—a large part of this amount being produced in Southern New-Jersey."

A FINISHED COUNTRY RESIDENCE.

THE ACCOMPANYING ENGRAVINGS represent a dwelling recently erected by an eminent literary gentleman of New-England, who has devoted much attention to landscape gardening, and who writes to us as follows:

"I have made outlines of the first and second floors, to a scale of 30 feet to the inch, which I trust may serve you. Only two or three rooms are completed in the attic. In the basement are laundry and man's room, besides two others (under dining-room and sitting-room) still unfinished. The noticeable features of the house are:

"1. Use of rough material (stone) from the fields for first story, with brick quoins and window dressings.

"2. Exposure of all principal rooms, by at least one window, to south light. You will also observe that no room of importance has a north light, and the body of the house is thoroughly protected by intervening corridors, pantry, &c., against north winds.

"3. The confinement of water pipes and connections to a narrow belt through the house, near flues, to ensure against cold, and to make leakage (if any should occur) less general and disastrous.

"4. The absence of *all paint* in the interior of the house. The wood—white and yellow pine, with some chestnut, butternut and ash—being simply washed with a light stain of asphaltum, in no way obscuring the grain, but simply giving the tint of age.

"There are no *mouldings* proper, inside or out, all finish being of the most simple character.

"The walls are of *sand finish*—floated off and left rough. They are kalsomined with different tints in different rooms.

"The exterior painting (of the wood work) is in three tints, namely, *buff* for general surface; *brown* for trimmings, and *red* for chamfers, heads of rafters and roof of ventilating turret.

"A small elevator (not shown in the diagram) passes from the basement to the attic, for transfer of wood, coal, luggage, &c. It also connects at the upper end with the ventilating turret, so as to ensure draught through from bottom to top.

"A noticeable good thing in this house is the following: In the library is a large, old-fashioned fire-place, with tiles and stone hearth, capable of taking in wood three feet or more long, which I keep aflame all the winter (and late into such springs as this.) The back of the fire-place is of cast-iron, and behind this cast-iron plate is an air-chamber having a communicating small duct with the outer atmosphere. A flue from this air-chamber leads up in the chimney to the dining-room, attached to large chamber over library, and is closed there by a register. I had counted on this use of surplus heat from my wood fire to warm only the dressing-room; but it not only does this, but also pleasantly tempers the air of large room adjoining. It offers most agreeable proof of what heat we used to waste in old-fashioned fire-places; and I fancy that our ordinary coal grates waste nearly as much."

In addition to the preceding remarks, we condense the following extracts from a description of this residence which appeared in a New-York paper shortly after the building was completed:

In building, the owner's first considerations have been convenience and adaptability to the wants of his own family, subject to the dictates of a choice taste, but without special reference to any conventional rule of architecture. Hence it has frequently required a most fixed purpose to enable him to overcome the prejudices of architect, carpenters, masons, &c. The outer walls of the first story are built of the rough stones found on the farm, the owner thus putting into practical execution his published and favorite theory that this material, only too accessible to nearly every New-England farmer, should be thus utilized. In the present instance the stone is from rough boulders of granite, trap, sandstone and gneiss. For the windows brick timmings have been used, which pleasantly relieve the dark stone. The second story is constructed of pine wood, and is surmounted by the somewhat abruptly receding slated cottage roof. The chimneys are a combination of bricks and small chips of the stones found on the place. A pretty little ventilator juts up from the roof, from the different windows of which charming views are enjoyed.

On the northwest corner an L was built, with a side entrance. This contains a large kitchen, with three sleeping rooms above for servants, whose quarters are thus entirely by themselves. A sudden slope of the land on the west of the house affords a spacious basement, wherein is a laundry and sleeping room for the man servant, and gives ample light to the large and well arranged cellar. Water is supplied to the house from

a reservoir on the farm, and a large reserve is kept in a tank in the garret. Externally the house is painted a yellowish brown, with dun-colored facings.

But we must pass inside to appreciate thoroughly the charming character of the innovations against conventionalism. Pausing a moment on the little front portico, we observe that the entrance to the house is through a heavy door made in two halves, and composed of chestnut, black walnut and butternut, which, like nearly every piece of wood of any kind used in the house, was grown upon the farm, having been carefully selected, cut and allowed to season under the owner's own eyes.

Once fairly inside, you stand facing west, having on your left a large drawing-room, connected by folding doors with a smaller sitting-room, both rooms having long windows opening on the south portico, which runs the length of the house. Opposite you, at the end of the hall, is the dining-room, large, high, and with doors leading into a cupboard stocked with beautiful china, and into a little closet heated by warm pipes, where the children of the household dry their garments and shoes as they come from school, while a long window opens on a pretty litttle west portico.

You are surprised as you enter the hall to see no stairway or door to the right, but passing down near to the entrance of the dining-room you discover that here the hall makes a right angle running to the L, and in this angle you discover the hitherto concealed stairway on your left, and the library door on the right. By having no entrance from the front hall, the author will escape unsought visitors and noises when engaged in his library, and yet has the full advantage of the front and south views from the windows thereof, which reach from floor to ceiling. A convenient little dressing-room opens from the library to the north. In the hall and dining-room there will be no carpet, the floors being of ash well oiled, and bordered with slats of black walnut and stained yellow pine. In the drawing-room and sitting-room this same border is used to the width of about a foot all around each room, so that the carpets—quiet patterns in Axminster and Brussels, all cut square, and being fastened, inside their under borders, with a patent screw fitting into a socket—can be taken up and put down with very little trouble—certainly a blessing to housekeepers. The parlor mantel and chimney piece is like that of the library, in being made of native woods handsomely stained. The wainscoting of the hall is of fine woods—oak, walnut, ash, chestnut and yellow pine, in alternation.

The walls of the hall are kalsomined a dark maroon, those of the dining-room light brown. In all the wood-work of the interior no paint whatever was used, except on the window sashes, which are a dark red. In every other case a dark walnut stain has been used, which has taken so well upon the white and yellow pine that they have the appearance of hard wood. The front stair-case is of black walnut risers, ashen stairs, the steps

Fig. 88.—*Ground Plan.* A—*Parlor*; B—*Sitting-room*; C—*Library*; D—*Dining-room*; K—*Kitchen*; S H—*Stair-hall*; R—*Cloak-room*; P—*Pantry*; G—*Glazed Corridor*; M—*Milk-room*; B L—*Back Lobby*; B Y—*Balcony*.

wide and ascent gradual. The posts are of handsomely carved black walnut, the balusters alternate ash and black walnut, the former twisted like a rope, the latter smooth.

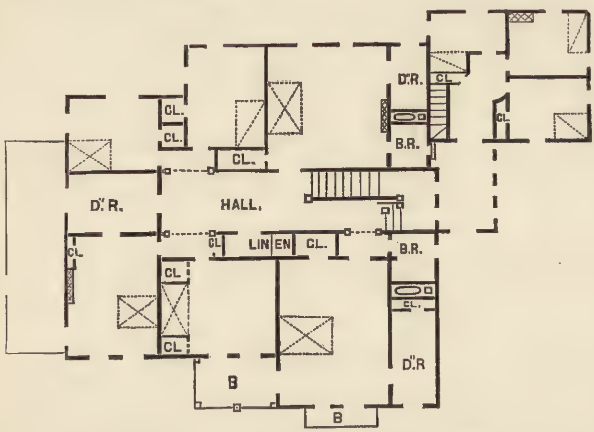


Fig. 89.—*Plan of Second Story—Scale,* 30 *feet to the inch.* B—*Balcony;* B R—*Bath-room*—C L—*Closet;* D R—*Dressing-room.*

The second floor contains six chambers, with accompanying dressing and bath-rooms, etc. The arches over the doors to the chambers are of stained white pine, with a Dutch or majolica tile set in the centre. In many of the rooms are alcoves for the beds similarly ornamented. The door sills on this floor are of cherry. In the southeast or guest chamber is an English slate mantel-piece, ornamented with flowers exquisitely painted and then baked therein. Upon the third floor, to which a convenient little elevator for trunks, bundles, etc., runs from the first story, but two chambers and dressing-rooms are as yet finished, leaving an immense play-room for the many little curly heads that now gladden the house and the heart of the owner. In fact, the comfort of wife and children has been constantly studied in the building of the new house, as is evidenced in the innumerable little details, a single instance of which is the possession of a large closet for each child to call its own.

How to Build a House.—Suppose a frame enclosed with clapboards or siding, ready for the masons. Have strips an inch, or inch and a quarter wide, sawed from common boards, and nailed in the centre, up and down, of the studding, upon which nail lathing. Let your mason apply a scratch coat of strong, coarse hair mortar from ceiling to the floor, *without a skip.* Then let him commence lathing on the studs in the usual way. This makes rooms cool in summer and warm in winter. M.

A CHAPTER ON TYING KNOTS.

THE FARMER who knows how to tie the right kind of a knot with a rope, cord or strap, with neatness and despatch, possesses a useful accomplishment, and will often save time and trouble in the numberless cases where this kind of skill is needed. For the purpose of assisting the unskillful and inexperienced, we give a few brief directions, accompanied with illustrations, to show how some of the more common and useful knots are tied, to which many others might be added, especially of those known to sailors, but these here described embrace nearly all that are necessary for farmers to know.

Fig. 90 represents a loop or knot used only for shortening a rope already too long. By drawing out the stick it is instantly loosened. It is sometimes used for suspending weights, by lifting which slightly the stick is readily removed. Fig. 91, known as the "reef knot" by sailors, is the most useful knot where two ends are to be fastened together, and represents the cords loosely connected; fig. 92 shows the same tightly drawn together. As a general rule, the best knot is the one that is neatest in appearance, and this combines both qualities. It will be observed that the ends and the main cords lie closely parallel together, or on the same side of the loops. This knot is often spoiled and rendered nearly useless by placing the ends and cord on opposite sides of the loops, as shown in fig. 93, and is a very common way of tying; when drawn together it is shown in fig. 94. The only use which this mode possesses is in putting up bundles, books or other packages, when we wish the cord to cross at right angles, and where it answers an excellent purpose.

Fig. 90.

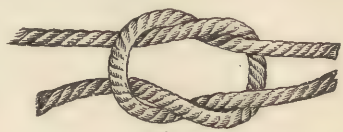


Fig. 91.

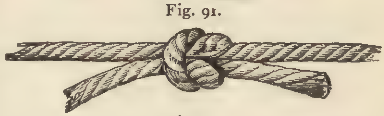


Fig. 92.

Fig. 93.

Fig. 94.

Where it is desired to tie a firm knot which may be easily loosened, the reef knot just described is modified by forming a loop on one side in place of the end of the cord, as shown in fig. 95. It will hold as firmly as the knot shown in fig. 92, and may be instantly loosened and untied by a single jerk of one of the ends. Fig. 96 represents the same with two loops, and is sometimes called a rosette or double knot.

Fig. 95.

The quickest way of tying two ends together is shown by figs. 97, 98 and 99. Place the two ends parallel together, as represented in fig. 97; then tie a common single knot near the end, as shown in fig. 98; then draw the two cords or ropes apart so as to tighten it, as shown in fig. 99, and a very secure connection will be found, which will not untie or slip. It is rather rough and awkward in appearance, but is often useful on account of the quickness with which it may be formed.

Fig. 96.

Fig. 97.

Fig. 98.

Fig. 99.

Figs. 100 and 101 represent the "weaver's knot"—the first as loosely put together, and the last as finished by drawing firmly together. We give, from a late writer, a description of the mode of making it, although we think it may be better understood from our engraving: "On a small scale, lay the ends of the two cords to be united between the thumb and first finger of the left hand, the right hand end undermost; pass the right hand cord back over the thumb to form a loop, and bring it back under the

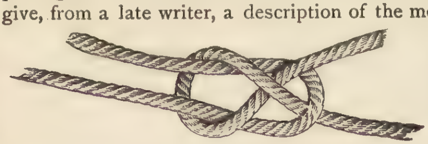


Fig. 100.

thumb and hold it fast. Now put the end of the upper or left hand cord over the right hand cord and through the loop. Catch it with thumb and finger of the left hand, and tighten by drawing the right hand."

Fig. 101.

For readily attaching a rope to a timber, mast or any part of a building, for sustaining a continued force, the timber hitch shown by fig. 102, answers a good purpose. The

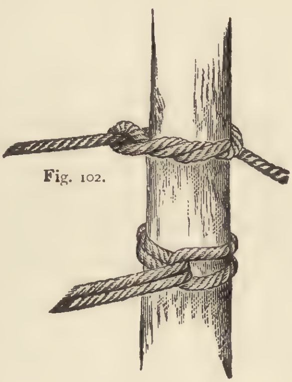


Fig. 102.

Fig. 103.

Fig. 104.

Fig. 105.

greater the force exerted, the firmer it will hold, in consequence of the hard pressure against the timber. A noose or running knot with a double rope is represented by fig. 103.

Fig. 106.

Figs. 104 and 105 represent the simplest mode of forming a running knot for a loop, the first loose, the last drawn tight.

To form a loop which will not slip or draw tight, and thus prevent its sliding

Fig. 107.

freely, double the end of the cord, as in fig. 106, and then tie a common simple knot, as shown in fig. 107. This is the quickest way to

form such a loop. A very compact and secure one is shown by figs. 108 and 109, and is much used by booksellers and others who use strong cords for binding heavy packages, by passing the cord through this loop.

Fig. 108.

Fig. 109.

Loops.—Fig. 110 represents a simple running loop, tied with a loop in the knot, so that it may be instantly untied by jerking the end. This is a common way of tying horses' halters, being quickly tied and quickly loosened. To prevent the animal from working it loose, thrust the end through the loop of the knot, as in fig. 111, which will render it perfectly secure. Every boy should know how to tie this very simple knot for hitching horses, but many boys, as well as men, do not.

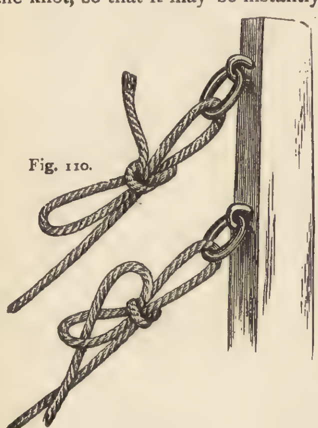


Fig. 110.

Fig. 111.

As it is exceedingly convenient for every one who works on a farm to know how to tie quickly the various knots described in this short article, it will be an interesting exercise, both for boys and men, on rainy days and long evenings, to procure a small rope or cord and acquire a ready practice in forming the various kinds here figured and described.

Ironing Single Whiffletrees.—The form shown in fig. 112 is strong, and when it comes into contact with a tree, it passes without injuring it, owing to the circular form of the iron P, which is attached by two rivets, L L. In case the part at X has become so worn as to be quite unsafe, the rivets can be removed by cutting one end with a cold chisel, just sufficient to allow of its removal; then by cutting off a little of the wood, (so that the rivets will again reach through,) and reversing the iron P, it can again be riveted, and the whiffletree is ready with a comparatively new iron, and all can be done in a half hour's time. L. D. Snook.

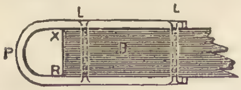


Fig. 112.

NOTES ON FLOWERING PLANTS.

JACKMAN'S CLEMATIS, (fig. 113.)—Of all the new hybrids and varieties of the clematis, the Jackmanii stands pre-eminent for the intense violet purple of its sepals. It is a trailer or climber, and when a trellis or other support is densely covered with it in bloom, it presents a magnificent display. It appears to be hardy. There are several other sorts with larger flowers and paler colors.

Fig. 113.—*Jackman's Clematis.*

Fig. 114.—*Peach-Leaved Campanula.*

PEACH-LEAVED CAMPANULA.—This is an old and well known herbaceous perennial, of very distinct form and appearance, with large blue flowers, borne on rather slender stems. There is a handsome white variety, and also one double white

Fig. 115.—*Dodecatheon Meadia.*

Fig. 116.—*Trillium grandiflorum.*

DODECATHEON MEADIA, (fig. 115,) often called the American cowslip, is one of the handsomest of our native May and June flowers, now widely cultivated in gardens. Its erect stem, crowned with its beautiful drooping flowers on the summit, has a graceful appearance. There is a rose and a white variety.

TRILLIUM GRANDIFLORUM, (fig. 116,) another of our handsome native plants, is distinguished for its conspicuous pure white flowers, changing to light rose. It is common in dense woods in many parts of the Northern States. It blooms in May and June, and after the flowers have disappeared, the leaves still remaining, it may be easily taken up with a garden trowel, and removed to the garden bed. If fifty or a hundred are placed together, they will afford a fine display next season.

OXALIS ROSEA, (fig. 117,) called also *O. floribunda*, is a Brazilian perennial species, growing about half a foot high, and blooming profusely with rose and white flowers, which open in the morning and close in the afternoon. Frost destroys the bulbs, and it is properly a greenhouse bedding plant.

Fig. 117.—*Oxalis rosea.*

Fig. 118. *Cyclamen Persicum.*

CYCLAMEN PERSICUM, (fig. 118.)—Cyclamens are beautiful greenhouse plants, which flower early in spring. Smee says the best plan in raising them is to sow the seed in March and transplant the small seedlings into separate pots; the next year they blossom well, and the succeeding year freely. The bulbs are then in their prime, although with care they will grow larger and yield more blossoms in future years. But it is preferable to rely upon a fresh supply, rather than to continue old ones too long. The species represented in the cut is the one most commonly seen, but it is not so hardy as *C. hederæfolium*, which is very handsome, and the hardiest of all the species. It blooms in autumn, the flowers white or pink, red at the throat.

CINERARIA, (fig. 119,) is one of the most commonly cultivated and prettiest of greenhouse plants.

Fig. 119.—*Cineraria.*

Fig. 120.—*Primula Auricula.*

PRIMULA AURICULA, (fig. 120,) or common Auricula, has received great

attention from florists for nearly three centuries, and many varieties have been raised, with all shades of yellow, maroon and purple, the latter sometimes almost black, with tints of grayish green and blue. It requires a good deal of care, and a rich shaded border.

The varieties of PHLOX SUBULATA give us some of the most beautiful and showy spring garden flowers. The common pink variety is well

Fig. 121.—*Phlox Nelsoni.*

Fig. 122.—*Chinese Primrose.*

known for its brilliant display of blossoms in dense masses. Among the white varieties, *Nelsoni* and *nivalis* are the best.

CHINESE PRIMROSE, (*Primula sinensis,*) fig. 122, is one of the handsomest and most widely known of greenhouse ornamentals, and is often seen in window gardens. *Primula denticulata* is another handsome species. Both are half hardy.

Fig. 123.—*Primula denticulata.*

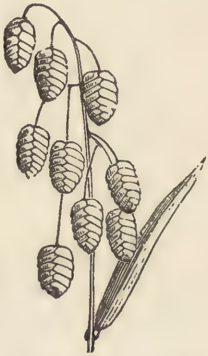


Fig. 124.—*Briza maxima.*

It will not be out of place to mention the common ornamental grass, *Briza maxima,* (fig. 124,) so commonly employed in the more loose and graceful floral bouquets.

Wood Anemone, (*Anemone nemorosa,*) fig. 125.—This is a delicate and pretty vernal flower, growing in the margins of woods, and is a native of both Europe and America. It has a white flower, and is much planted in ferneries. It might be used with a handsome effect in the shade of shrubberies and under trees in ornamental grounds. It is of easy culture, and in rich leaf-mould, like its native soil, it will grow year after year without care, provided it is sufficiently shaded.

Fig. 125.—*Anemone nemorosa.*

Fig. 126.—*Trollius Europæus.*

Globe Flower, (*Trollius europæus,*) fig. 127.—This is allied to the Ranunculus, and has a lemon yellow, handsome flower. It is in bloom from May to July.

Parnassia Palustris, (fig. 127,) sometimes called the Grass of Parnassus, is a native of both Europe and America, but not common in this country. It succeeds best in a damp spot, fully exposed to the light. The flowers are white, and it presents a fine effect when grown in masses.

Purple Lythrum, (*Lythrum salicaria,*)—fig. 128—bears dense spikes of handsome purple flowers, varying to purplish red, and blooming about midsummer. It is often cultivated in gardens, and is the more desirable for the season of its apppearance after early summer flowers have gone. When grown in quantity, it makes a fine show. In Southern England it is a brilliant ornament to river banks where it grows wild with luxuriance.

Fig. 127.—*Parnassia palustris.*

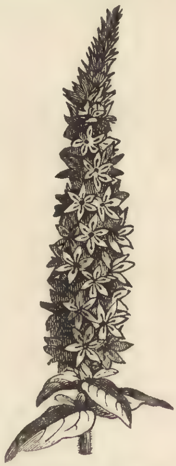


Fig. 128—*Purple Lythrum.*

PENTSTEMON GLABER, (fig. 129,) is one of the many fine species of Pentstemon brought from the regions of the Rocky Mountains. Some of them run much into varieties, and they form a very important addition to our fine ornamental collections.

Fig. 129.—*Pentstemon glaber.*

SIBERIAN SQUILL, (*Scilla sibirica,*) fig. 130, is one of the most beautiful spring flowers, immediately following the Snowdrop, and when planted in quantity, forming splendid masses of clear blue flowers. It grows from bulbs and is perfectly hardy, retaining its place in the flower bed year after year without care. The soil should be rather sandy.

Fig. 130. — *Siberian Squill.*

BOCCONIA CORDATA, (fig. 131.)—This is a tall, hardy, herbaceous perennial, which will continue to grow and take care of itself year after year. Although not brilliant, its tall form well fits it for ornamenting the remote portions of the lawn.

CAMPANULA TURBINATA ELEGANS, (fig. 132.)—"Among dwarf Campanulas," says the Garden, "suitable for beds, this is the most ornamental in the large and beautiful family of bell-flowers, forming, as it does, a compact leaf growth, and yielding from seed a mass of comparatively large, rich, purplish-blue, white and porcelain-white flowers during the summer months. To

Fig. 131.—*Bocconia cordata.*

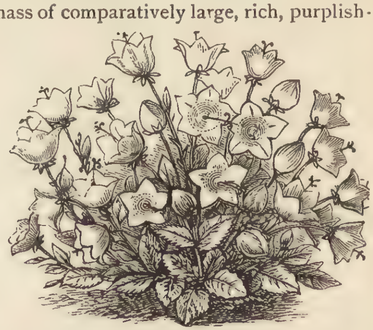


Fig. 132.—*Campanula turbinata elegans.*

have it in bloom the first season, it should be sown in the earliest spring months, and thus treated it will flower in the summer and autumn, or, if the plants bedded one season are again divided for planting in May, these will bloom effectively in the summer months, and, if sown in May, vigorous plants will be secured for the following year. *Campanula turbinata elegans* is a hybrid between *C. turbinata* and *C. carpatica*, and it is greatly superior to both its parents as a decorative summer flower."

MAIDEN-HAIR FERN, (fig. 133.)—Many of our readers are familiar with this beauiful fern, *Adiantum pedatum*, which we regard as the handsomest of all our native species. It may be removed from the woods and transplanted into the wilder, more rocky and densely shaded parts of the ornamental grounds, or introduced into the greenhouse or plant case. The London Garden gives the following description:

Fig. 133.—*Maiden-Hair Fern.*

"This is unquestionably one of the most distinct and beautiful of the hardy ferns at present in cultivation. It is a native of North America, where it grows abundantly in the woods and forests, delighting in the shade of trees, and in the cool, moist deposit ot rich leaf-mould, which is found beneath their branches. The stems are slender, black, and polished, rising erect to a height of from nine to fifteen inches, and bearing at the summit forked fronds, recurved almost horizontally, the divisions of which are all on one side, and are usually seven or eight in number. The pinnules are of a triangular-oblong shape, and appear as if halved, being entire on the lower margin. from which all the veins proceed, and cleft and fruit-bearing on the other. This charming fern is particularly suited for the lower and shaded parts of rock-work, or the shaded parts of borders and shrubberies, where it can enjoy a cool, moist, peaty or vegetable soil. It also forms one of the finest ornaments of the conservatory, for which purpose it should be potted in a mixture of peaty loam and leaf-mould. The plant is easily multiplied by division of the tufts. This is best done in autumn, and care should be taken not to injure the roots. Pot the divisions in peaty loam and leaf-mould, and put them under a frame for the winter. In the following spring they may be planted out."

ORNAMENTAL SHRUBS.

JAPAN QUINCE, (fig. 134,) is well known as one of the most showy of all spring-flowering shrubs. It is a slow and somewhat irregular grower, but by shortening in may be reduced to a sufficiently symmetrical shape. When in the course of ten or twenty years it reaches a height of six or

seven feet, and a corresponding breadth, nothing can exceed the brilliance of the display of its scarlet flowers. A white variety, delicately shaded with pink, is not less beautiful, although much less showy.

Fig. 134.—*Japan Quince.*

Fig. 135.—*Red Flowering Currant.*

RED FLOWERING CURRANTS, (fig. 135,) of which there are several varieties, although some of them are slightly tender, are easy of propagation and culture, and if pinched in and kept in a compact, symmetrical form, present a handsome and ornamental appearance when in bloom.

SCARLET RHODODENDRON, (fig. 136.)—A large number of varieties have been raised from *Rhododendron catawbiense*, in which pink, scarlet and

Fig. 136.—*Scarlet Rhododendron.*

Fig. 137.—*Scarlet Hawthorn.*

purple predominate. Some are beautifully spotted. Many plants are imported from England, and if set on the north side of a house or wall, in suitable soil, they will continue to bloom annually for many years, uninjured by winters. They flower early in summer. We have seen them interspersed through a wild shrubbery with excellent effect, the partial shade affording for them the desired protection.

SCARLET HAWTHORN, (fig. 137.)—The English hedge Hawthorn, a large shrub or small tree, has white and pink flowers in a wild state, but under

cultivation it has produced many exceedingly handsome varieties, including double white, pink, scarlet and deep red. These are grafted on the more common ones, and give us some of our finest blooming trees for spring.

BUILDINGS AND STRUCTURES.

PLAN OF STABLE BASEMENT.—A correspondent at Berryville, Va., sends us a plan of his unfinished barn basement, with a request for the details in arranging it for horse and cow stables. It is 36 feet square inside, and has two rows of posts for supporting the floor above—these rows divide the basement so that there is a central alley 11 feet wide through the middle, with 12½ feet divisions on each side for the stables. The posts are mostly 4½ feet apart, which will make rather narrow stalls for the horses, and stalls a foot wider than is necessary for the cows. The whole width of stables should be about 14 feet—to secure which we must take two feet from the central alley on each side, and accept the divisions for the stalls, 4½ feet each for both cows and horses ; or else take only the 12½ feet for the stables, and make the horse stalls 5 feet wide, and the cow stalls 3½ feet wide. We should prefer the former, and therefore give the following proposed plan, so as to allow free access in the rear to wheel away the manure daily :

The basement walls are stone, two feet thick and eight feet high ; the places of the windows and doors are shown in the cut (fig. 138.) The dark dots show the places where the posts have been already set, being 4½ feet apart, and 7 feet from the walls at the ends of the rows. We propose to make boxes or pens at the rear of each row, which will be 7 by 14 feet, and will be useful for cows with calf, and for other purposes. One of the seven feet spaces in front is made into a wide stall, for two horses to stand in together to feed without unharnessing, the entrance door on that side being made wide enough for both to pass in side by side. The other seven feet space is a a harness room. The manure should be wheeled daily with a wheelbarrow from the rear of the stalls, which is better, easier and neater than throwing it out of the windows.

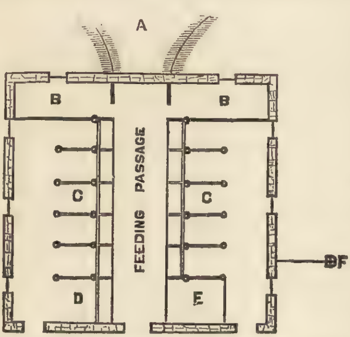


Fig. 138.—A, *Embankment for Roadway*—B B, *Box Stalls*—C C, *Ranges of Stalls*—D, *Wide Stall for Double Team in Harness*—E, *Harness Room*—F, *Lever Horse-Power.*

Basements are apt to be too damp for horses, unless special provision is

made to keep them dry. If the soil and subsoil are not dry sand or gravel, or have not a natural underdrainage, they should be perfectly drained artificially, and a free ventilation provided, so that the air may be fresh and pure at all times, and there should be a free circulation under the plank floor.

A sweep horse-power is placed outside, for cutting fodder, &c. The shaft from it may extend inside, and a band run up through the floor to the cutting room. The bays on the floor above may be on each side of a central floor or passage-way, and the granary and cutting room occupy one side, with the bay over them.

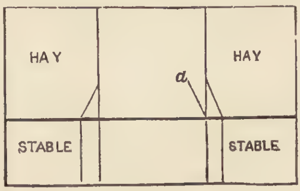


Fig. 139.

Fig. 139 is a section, showing the manner in which the hay is thrown down from above.

Cheap Ice-House.—If a solid mass of ice, six or seven feet cubic measure, made of solid blocks laid compactly together, is encased in compact sawdust ten inches or a foot on each side, well drained at bottom, and well ventilated at top, it will keep, no matter how rude the building may be. We have never seen ice keep better than in an old open cow-house shanty thus encased. A correspondent of the Country Gentleman thus describes a cheap ice-house made by a neighbor:

"It is a crib 10 by 10½ feet inside, and 8 feet high, and set directly on the surface of the ground; the posts are made of slabs and the sides are of the same, nailed on horizontally 2 or 3 inches apart. Cost of lumber, $4; nails, 50c.; labor done by a farm hand. Five three-horse loads of ice filled it. In filling, one foot of sawdust was put in, then a layer of ice one foot from the sides, the edges packed and the middle broken up a little, and as each layer was put in, sawdust was filled in between ice and boards, and so on till the crib was filled. The top was finished rounding, and covered with a foot of sawdust, and pine boughs on that, to keep the wind from blowing it away, and has had no roof of any kind. The first of September, there was still 16 inches of ice left."

Wells in Quicksands.—If the soil is sufficiently firm for the well to be dug in the ordinary way, the quicksand may be prevented from running through the stones into the well by laying them up with moss from the swamp; or still better and more permanently, by filling between the outer stones with clean gravel, or even with coarse sand, as well as lining the outside of the stones with a narrow stratum of gravel. If the quicksand is too liquid in its nature to admit of the ordinary mode of digging and stoning up, construct a circular double frame or support of two-inch plank, with an opening in the centre the size of the intended well, as shown in fig. 140.

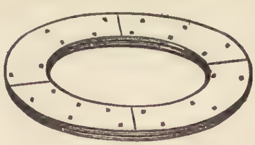


Fig. 140.

The frame is most easily made by making two hollow squares of plank, and nailing them diagonally to each other, and afterwards cutting the circles (fig. 141.) Then dig down through the hard earth large enough to admit this frame, until you reach the soft quicksand. On this begin to build the wall. If stones are used, fill the crevices with moss, gravel or coarse sand, as already described. If brick are employed, as is often the case, select those that are hardest burnt, and lay them pointing inwards all around, (fig. 142,) so as to form a wall like an arch, eight inches thick, or with a thickness equal to the length of the bricks. It is common to lay them in water-lime cement, so as to exclude entirely the water and sand, except at the bottom ; but it is better and cheaper to fill the interstices with clean sand, and if the work is well done, they will keep their places. As you build upwards, the weight of the wall will gradually sink the frame into the soft sand, which will be pressed up in the centre of the well, when it is scooped up and carried out with a long-handled shovel. If the depth is considerable, the well must be large enough to allow a man to enter, and to draw up the contents. It is commonly best to make a rim for the outside edge of the frame, against which the outer ends of the bricks are laid with less difficulty and more accuracy than without it. This curb or rim is made of a thick board sawed nearly through at short intervals, according to the common way (fig. 143.) This wood being always under water, will not decay or injure the taste of the water. If, as is sometimes done, the sides are walled with wooden curbs, the water rising and sinking will be sure to cause decay, and give in time the taste of rotten wood, besides rendering the water unwholesome.

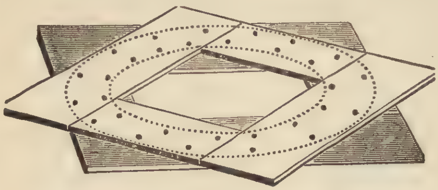


Fig. 141.

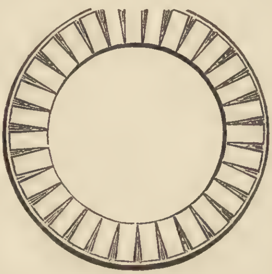


Fig. 142.

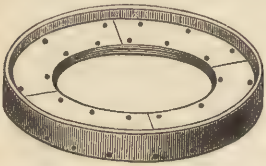


Fig. 143.

Banking up Cellars, to exclude frost, can never be done so as to present an ornamental appearance, and it is commonly very repulsive. A neat substitute may be made by placing a lining of boards (which may be thin lath boards, or any thicker kind) inside the cellar, opposite the underpinning or part exposed, and three inches from it, with a board bottom.

If this is now filled with sawdust, chaff or coal ashes, it will form a better protection against frost than any banking that can be given. The boards are easily nailed into place, against short pieces of plank or small scantling, secured to the joists above, and extending down as far as the underpinning goes. Any farmer who knows how to use tools can do this work in a short time; and he may leave the boards rough, or give the whole a neat and smooth appearance by planing. In the accompanying figure, (fig. 144,) a section of the upper part of the cellar wall is represented; A is the sill, B the joist, and C the space filled with chaff or sawdust. The short pieces of plank or scantling are nailed at their upper ends to the joist at B, and extend down as far as the sawdust space is to go, and to their sides and ends the boards are nailed.

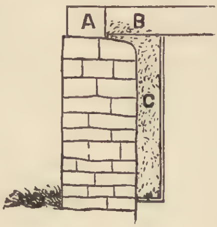


Fig. 144.

Construction of Cow Stables.—Some excellent directions, the result of practical experience, are given in the Country Gentleman by H. R. W. of Irvington, N. Y., the substance of which is as follows:

It is common to make a gutter in the floor of the stable, just behind the animals. This does not work well. The solid droppings will soon impede the flow of the water, and make the gutter filthy and difficult to clean. It is better to grade the floor with an uniform fall to the rear of the stable, where a gutter for the water is to be made, (fig. 145.) The solid material never reaches or obstructs it. The floor or platform upon which the cow stands is the important part upon which depends the cleanliness, health and comfort of the animals. To construct it—first lay a brick floor in cement all over the stable, and with an uniform grade from front to rear falling towards the gutter, with an inclination of about three inches in ten feet. Upon this lay out the stalls, with short partitions, but sufficiently high in front to blind the cows from each other. If the stalls be too wide, the cows will stand quartering and defeat your object, which is to make them stand so that their droppings will clear the platform. Then for the wooden platform or floor of the stall, make a simple frame like a sled, and cover it with plank. It should not be heavy. Two-inch plank will serve for the runners. Six inches is as high at the rear end as I should care to make it, and some consider this too high, for the reason before given. The forward end should be enough lower to bring the top level when it is put in place on the inclined brick floor.

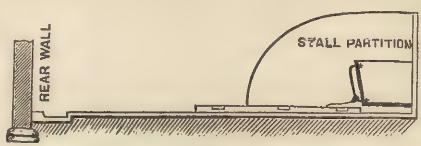


Fig. 145.

The sketch, fig. 146, shows the platform, and fig. 147 exhibits it in place.

It can obviously be adjusted to any required length, by drawing it out or sliding it under the manger. One of these must be made for each stall, and fitted loosely between the partitions, so that it will slide freely, and that it may be taken out, if need be, for drying or cleaning. No rat can find harborage in such a floor, and it may be thoroughly washed by dashing water over it, which finds its way directly to the gutter. It never rots, and scarcely ever needs attention or repairs. And yet with all this adjustment, a cow will sometimes crowd forward and deposit excrement upon the platform, or else back out and get soiled by lying down with her body partly on the floor below. The general result, however, is better than that of any other plan I have seen.

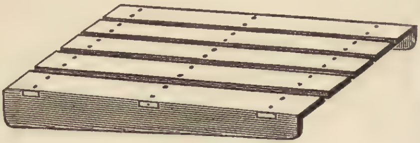


Fig. 146.

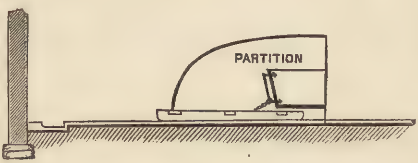


Fig. 147.

For securing the cows I use a traveler, (fig. 148,) with a short chain and strap. The traveler is made of half-inch round iron, bent at each end at right angles, and with a thread and nut for securing it to the front of the manger, as shown in fig. 149, or to a a suitable post. A chain or rope of eight or ten inches long, with a ring at one end, runs up and down the traveler. The other end is permanently attached to a wide strap, which is buckled around the cow's neck when she takes her place in the stall. With this she can feed comfortably, lie down and turn her head. While it gives a little more liberty than is desirable on some accounts, it probably gives no more than her comfort requires.

Fig. 148.

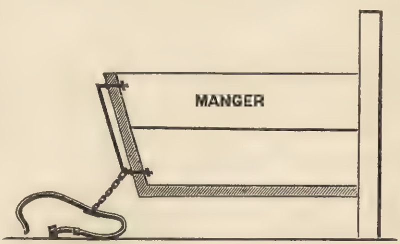


Fig. 149.

The cement floor, to be secure from cracking by frost, should be composed of very clean, sharp sand and the best Rosendale water lime, or else be in a basement where it will not be frozen.

Heating a Dairy.—The substance of the following mode was given by Col. Waring, in the Agriculturist. He adopted it after numerous experiments. Stoves produce dust, smoke and gas. The buttery is to be

heated to about 60° ; the milk room, on a lower level, a little cooler. The boiler is copper, and cost $28 new. It is shown on the left of the section, (fig. 151,) is hollow and double, the fire within. Less than a peck of coal will do all night, the fire being regulated. Being outside, no dust or smoke will do any harm. Iron pipes, to warm the house by circulation, like those of a green-house, are connected by lead pipes to the top and bottom of the boiler. The boiler and pipes are filled by pouring water into the upright pipe on the right, which connects the two horizontal pipes, and is open at top, and which should never be so full as to boil over. By a plug at the bottom, the water is emptied from the boiler occasionally, to remove sediment. The pipes are near the floor in the buttery, and give off much more heat than in the pool-room, where they are placed high. It is a good contrivance to make winter butter, and Col. Waring says it is cheap, simple, easily managed, and entirely satisfactory.

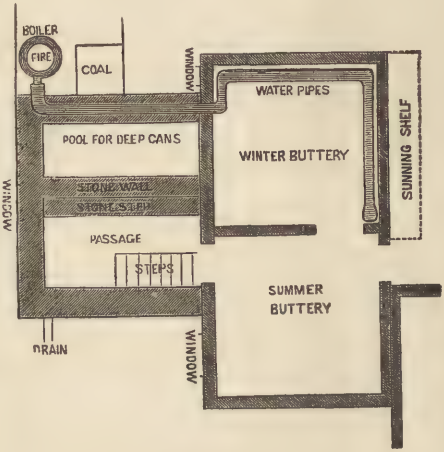


Fig. 150.—*Ground Plan of Dairy.*

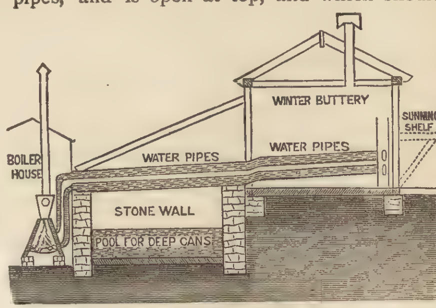


Fig. 151.—*Section of Dairy.*

FLOATING CURDS.—A recent writer "is satisfied that the cause of floating curds is conveyed to the milk through the atmosphere, and that curds are more likely to float the day after hot, showery weather. The gas that lifts the curds in the whey may be traced to close stables, with more or less decaying manure, too near the milk pails and cans. If cows were milked in the yard or open sheds, with clean surroundings, would not floating curds disappear? I have found that morning milk has most of the floating element in it."

SUGGESTIONS IN RURAL ECONOMY.

REVERSIBLE CORN-MARKER.—L. D. SNOOK furnishes the COUNTRY GENTLEMAN a description of a marker for different widths, shown in fig. 152. M is a plank 2½ or 3 inches thick, one foot wide, and as long as the width of rows will determine; A A A A are runners or markers 2 feet in length, and 4 by 6 inches wide; of course it is understood that the wider they are, the greater is the distance from the bed piece, M, to the ground, less liable to clog, &c. Runners, B B B, are shown nailed, or otherwise secured, on the top of plank M—are the same dimensions as the lower ones, A A, and are secured at any desired width. A common tongue, S, can be used to draw it, at the large end of which are firmly bolted iron braces, P P, which are hinged to the front edge of plank M by a common gate hinge, T, in the manner shown in small figure. By removing the whiffletrees and turning the tongue and frame over backwards, then attaching the whiffletrees to the side then up, you are ready to mark a different width, or remove the small key or nut from hinge, T, and reversing the marker only, the same effect will be produced. Attaching the runners A and B in the manner shown makes a very strong and substantial marker, upon which the driver may ride, or place other weight, when the character of the ground should necessitate.

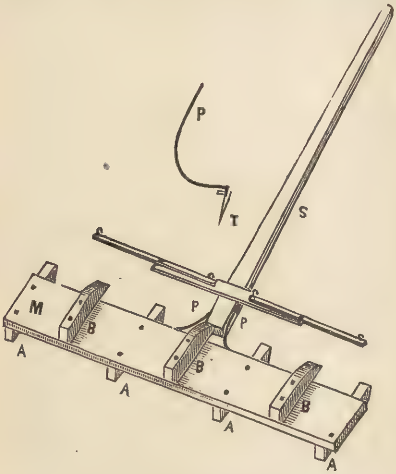


Fig. 152.—*Reversible Corn Marker.*

A SERVICEABLE DRAG.—I make the side pieces or frame of two-inch plank, eight inches wide, and turned up at the ends, and nail the bottom boards on with heavy spikes. I use 1½ inch lumber for the bottom, and it does not matter how wide or how narrow it is. I put a

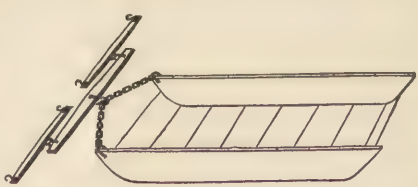


Fig. 153.—*Drag.*

seat on it and ride, as my weight helps to crush the clods. By having the ends slightly turned up, it runs easier, and does better work. I always haul all small stones off the field on my drag. Any farmer who can use an axe, a saw, a hammer and an auger, can make one, and after he has once used one, he would not farm without it. It runs lighter than a roller, and *grinds* the clods and lumps to powder, while a roller very often only *presses* them into the ground. And it levels the ground better than a roller can do; after going over the field with a drag, it looks as if it had been gone over with a smoothing iron, and it never packs the ground. A. M. S.

THREE-HORSE CLEVIS.—A correspondent describes the arrangement for plowing with three horses, represented in fig. 154, which, although an old contrivance, may be new to some of our readers. The figure nearly explains itself. The short vertical iron lever is attached to the plow at a point two-thirds of the way down, so that the two horses will each draw equally hard from the lower end with the single horse from the upper end. The double tree must be long enough for the single horse to work in the middle. Any blacksmith can make the lever.

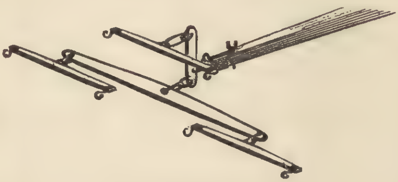


Fig. 154.—*Three-Horse Clevis.*

MANURE PUMP.—A three-inch boat pump, made by any tinman, has the lower valve, like any pump, fastened to a wooden plug with a hole through the centre; the plunger a leather pocket on the end of a wooden rod, as in fig. 155. A correspondent says he has used such a one for years, and found it to pump thick mud or any thing needed.

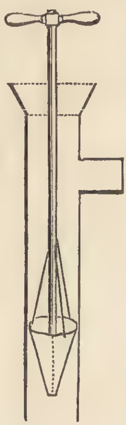


Fig. 155.

UNLOADING WAGONS.—Every man who unloads a wagon of corn, potatoes, coal, or other coarse loading, always has a job to get it started, before the scoop shovel can reach the bottom and work freely. To save this trouble, all he has to do is to lay a wide board a few feet long, sloping, as shown in fig. 156, and then fill up the box. When he wants to unload it, he has only to stand on the load at the left of this

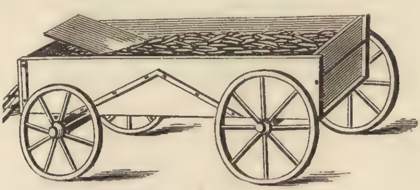


Fig. 156.—*Unloading Wagon.*

board, set the shovel on it and push down, and he will have no further trouble, every shovelful will come easily.

How to Manage Hen Manure.—The first thing is to provide proper reservoirs for the manure. Old barrels are just the thing, but strong goods boxes will do, if protected with oil or gas tar. Coating them inside and out with light crude petroleum will fill the pores with the oil, and make them as good as cedar for durability; but if the contents are likely to be moist, gas tar inside will be better. The number of these barrels must correspond with the number of hens; there should be one for every ten hens. Then fill all but one with road dust, which is the very best absorbent you can get; and, if dry, the barrels may stand anywhere under shelter without the freezing of the contents. If dry earth or dust cannot be obtained, the next best is finely pulverized soil, which will, of course, contain a good deal of moisture, and must be kept in barrels or boxes in the cellar, so as not to freeze. If you can procure a quantity of charcoal dust, it may be mixed with dry coal ashes, and the mixture will make a good absorbent. Dry sawdust will do, but it is not no good. When road dust or soil is used, the more clay it contains, the better it will be as an absorbent, and the less in quantity will be needed.

Now, having your barrels all ready, the rest of the operation will be simple and easy. All you have to do is to place a stratum, say an inch or two, in the bottom of the one empty barrel, and then throw in the cleanings of the hen-house; then another stratum, and another layer of cleanings. The thinner each layer of the two is, the more perfectly they will become diffused together in standing. The precise quantity of each is not very essential—only you must have enough absorbent to hold all the volatile parts of the hen manure, of which you may usually judge by the odor, which may be corrected by adding more of the absorbent. Proceed in this way with each successive barrel. In the spring your barrels will be filled with a very powerful and most valuable manure.

Fig. 157.—*Cross-Section of Barrel of Hen Manure Compost—the dark strata, hen manure; the light, road-dust.*

You may add to its value by pounding and cracking up fine all the refuse bones you can find, by means of a stone-mason's hammer or an old axe—placing the bones to be broken on a solid flat stone, and encircling them with a wide hoop to keep them from flying off when struck. Sprinkle the fragments of bone among the layers of manure, which will cut and work them down. A part of the broken bones may be left for the hens to eat with their food, and these will be manufactured in a more perfect manner into bone guano.

By a little care and timely attention, you will secure a supply of manure,

the value and quantity of which will surprise those who first make the trial. All you will have to do in the spring will be to pulverize and work over the mass, so that it may be evenly and finely applied.

Harvesting Grass Seed.—The best way to get out timothy seed is to thresh it with a flail—for although a threshing machine will work more rapidly, yet the seed which it cuts and wastes more than overbalances the advantages. When threshed out, then spread it out on the floor, go over it again thoroughly with the flail—then pass it very slowly through a fanning mill, so as not to blow out the seed, (which can be soon learned by examination ;) then pass it through a sieve fine enough for the clear seed to pass, but retaining the chaff-covered seeds, and thresh the latter again, and so on, till all is saved. For home use, all this care is unnecessary, but only to fit it for market.

Any land that will grow good crops of timothy for hay, will produce seed; but the great point is to have it clean and perfectly free from weeds. Wait until the earliest heads begin to scatter their seeds before cutting. Bind in small bunches, place three together, and tie tightly around the top. When dry, draw in with a tight bottomed wagon, to to save scattering.

Applying Lime.—It makes little difference how lime is applied, so that it is finely and evenly spread and harrowed into the soil, and not left in lumps. It may be spread from a wagon, or by means of a spreading machine, or worked into compost, as may be most convenient. In the case of compost, the precise quantity of muck or other material is not essential, provided the lime becomes ultimately well diffused through the soil. It is common in some places to leave it exposed in heaps for slaking, but it is much better, if already slaked, to spread it at once. The great point is to keep it in the condition of fine powder.

Keeping Roots in Winter.—Our winters being colder than those of England, roots require more protection. They may be placed smoothly in piles about three feet high, and of any desired length, and then covered first with straw and afterwards with earth, beaten compactly with a spade. The earth should not be applied copiously till near freezing up. If straw is to be had in plenty, a thick coating of it is best, obviating a heavy coat of earth : that is, if it is six or eight inches when packed, a few inches only of earth will do. Rutabagas will keep with less protection, say five or six inches of packed straw, and four or five inches of earth. Mangold wurzel will need more.

Top-Dressing.—Manure may be applied in autumn in many instances to much advantage. Young fruit trees which do not grow fast enough may be greatly benefited by spreading a large circle of manure about them, strawberry ground is enriched, and the plants protected by a thin, coarse coating; dwarf pears in exposed places are shielded from cold winds ; and lawns are improved by an even sprinkling of fine compost. The same principle of enriching and protecting, and of the diffusion of

liquid manure by the rains between autumn and the period of the beginning of growth in spring, applies to all crops, whether of the garden or farm, and in order to illustrate further this advantage, we repeat the statement made by Col. Waring, on a portion of whose farm he had made several vain attempts to raise roots, partly from having plowed the land too deeply and turned up a sterile subsoil. A heavy top-dressing changed its product from less than half a ton of grass, ox-eye and sorrel, to 4,000 lbs. per acre of very fair hay.

Use of Paris Green.—Permit me a few words about potatoes and the Colorado bug. The rascal has been troublesome with us for seven or eight years. Three years of that time the destruction of the crop was complete. In 1873 I prepared a piece of ground and planted with Early Rose the first of July. In two weeks they were fit for cultivation. I prepared a watering pot—the holes perforated for the escape of the water being very small—holding ten quarts, into which I put a teaspoonful of Paris green, and sprinkled the potatoes once. The bugs were destroyed ; and before another crop of bugs came, my potatoes were ripe, and for winter and spring use they could hardly be surpassed. No one here uses the drug in the powder, but all in water.—L. W. L., *in Country Gentleman.*

Cooking Cattle Food.—During the discussions at the State Fair at Elmira, in 1872, E. W. Stewart, who has had much experience in cooking cattle feed, said that cooking chopped straw made it worth about two-thirds as much as hay. A little grain added makes it as good as hay. He had found by experiment that ten pounds of straw and two quarts of middlings were equal to or rather better than ten pounds of hay. Oats and barley straw were about equal to each other in value, next wheat, and rye last. Middlings are better than meal, containing 18 per cent. of muscle-forming matter, and meal only 10 per cent. The best results are obtained in connection with the steaming of roots, oil-meal or bran, which make handsome butter when fed to cows. Corn fodder, with the exception of the water it contains, is about as good as hay. Clover is worth more than corn, but clover and corn together make the best balanced food. As to the general value of cooking food for cattle, it depended on the size of the herd whether it would pay—it will hardly pay for less than ten cows at least. Steam should be used. He had found that 16 pounds of cooked timothy hay were equal to 24 pounds uncooked, even when both were cut. As a general rule, cooking saves one-third. Fodder made of half stalks and half poor hay is doubled in value by cooking—the result of 15 years' trial. He recommended machinery for doing all the work, and said that one man could attend to one hundred cattle by the aid of machinery.

Runaway Horses, which could not be cured in any other way, have been easily and perfectly managed and entirely and permanently cured by placing a leather hood on the headstall, in such a manner that whenever the horse starts to run, a cord pulls this hood over his eyes. As soon as

he finds that he is blinded completely, he will slacken his pace and soon come to a halt—or if he does not, run him against some object that will give him a brushing, and he will soon get tired of the trick.

GRINDSTONES should never be run in a trough of water, as is frequently done. When the stone is still, the part in the water becomes soft by soaking, and wears unevenly. It is better to place a vessel of water on a frame at one end, and make a small hole in this vessel, so that a small stream will spout out upon the stone while turning, plugging it up when not in use.

PETROLEUM ON SHINGLES.—We find it a common opinion that petroleum makes shingles more inflammable, and we see this opinion urged by some of our more intelligent agricultural journals. They would be more inflammable if the oil remained at the surface, as it does not, but immediately penetrates the wood. It is unlike any other oil in this respect. One coat will penetrate pine a fourth of an inch laterally, and nearly an inch lengthwise. It becomes thus in a manner part of the wood itself, rendering it more compact. It will thus change pine or basswood to the character of cedar. It lessens the liability in shingles to form a fuzz on the surface by the action of the weather, and rather decreases than otherwise the tendency to take fire. We have made repeated trials by holding oiled and unoiled shingles near or in flame, and found the unoiled quite as liable to catch as the other. The heat of the sun is, of course, perfectly inadequate to produce combustion in them. We may mention an additional proof that the oil penetrates entirely the pores of the wood in the fact that on oiling the roof of a dwelling, the first rainwater that came some days afterward, was scarcely tainted with the odor of the oil, but was nearly pure; but if, like some other oils, it had remained on the surface, large quantities would have been washed down into the cistern.

CUTTING AND HARVESTING CORN.—A correspondent of the COUNTRY GENTLEMAN gives his experience as follows: "A self-raking reaper will cut corn, two rows at a time, and leave it in gavels of any desired size. I use the Buckeye, but see no reason why any other machine, with the Johnston self-rake, would not be equally efficient. Philip's spiral corn husker will husk at the rate of a bushel per minute, or more if the stalks can be handled so fast. The operation improves the stalks for fodder by crushing them longitudinally, and freeing them from dust and grit. Smith's power corn-sheller will shell at the rate of 150 bushels of ears per hour. These machines can be driven by a two-horse power. I conclude we are already very well supplied with machines for harvesting the corn crop."

DURABLE TIMBER.—A correspondent of the Prairie Farmer finds the wood of the catalpa much more durable than white oak for posts—catalpa posts set about 1845 outlasting white oak posts set about ten years later. But he finds the Osage orange on the whole the best timber for posts, growing rapidly, and proving very durable, and the plantation when cut reproducing itself readily.

NOTES ON FRUIT CULTURE.

THE BEST APPLE.—At a meeting of the Warsaw (Ill.) Horticultural Society the question was discussed, what apple combines most perfectly the three qualities of bearing, keeping and market value? Many prominent fruit growers took part in the discussion, and it was decided that for that region the Ben Davis met the requirements most perfectly, and Willow Twig next.

APPLES IN MICHIGAN.—The following is the list of summer apples recommended by the State Pomological Society: *Market Sorts*—Early Harvest, Red Astrachan, Duchess of Oldenburgh, Maiden's Blush. *Family List*—Early Harvest, Red Astrachan, Primate, Sweet Bough, Maiden's Blush. *Amateur List* (Dessert varieties of high quality)—Early Harvest, Carolina Red June, Sine Qua Non, Early Strawberry, Early Joe, Sweet Bough, Summer Rose.

APPLES IN CALIFORNIA.—A California journal gives the following select list of apples adapted to the region about Sacramento: *Summer*—Early Harvest, Early Strawberry, Red June, Red Astrachan, Summer Bellflower, Summer Rose and Williams' Favorite. *Autumn*—Alexander, Duchess of Oldenburgh, Fall Pippin, Gravenstein, Maiden's Blush, Jonathan, King, Rhode Island Greening and Yellow Bellflower. *Winter*—Ben Davis, Newtown Pippin, Rawle's Janet, Swaar, White Winter Pearmain. Nearly all these do well also at the East.

PRODUCTIVE ORCHARDS.—J. McCollum of Newfane, N. Y., says in a communication to a western paper that the three best market apples for Niagara county, N. Y., are the Baldwin, Rhode-Island Greening and Roxbury Russet; that in 1871 ex-Congressman Van Horn sold from nineteen acres $7,230 worth of apples, and his neighbor W. V. Corwin sold 980 barrels of Baldwins from 140 trees, at $3.25 per barrel.

DWARF APPLE TREES.—A correspondent of the Maine Farmer objects to dwarf apple trees, and finds "one thrifty standard apple tree to yield as much as half a dozen dwarfs." Of course. And the standard takes up as much room as the half dozen dwarfs. Dwarf apple trees are not planted for the purpose of obtaining heavy crops on a large scale, but are adapted to garden culture, when it is desirable not to shade the ground, and where several early or amateur sorts may be obtained fresh from the trees for home use. If handsomely trained and well cultivated, they likewise present an ornamental appearance; and they have the advantage over dwarf pears, that most varieties of the apple grow well in this way, while only a few select sorts of the pear will succeed well as dwarfs.

PRUNING APPLE TREES.—A late writer sums up briefly the following directions for pruning an apple orchard: Every limb that points inward, and all those that touch others should be taken out, and where two limbs

form a very acute angle, one should be removed, as they are liable to split when loaded with fruit.

SHEEP IN ORCHARDS.—J. Higgins stated, at a late meeting of the Alton Horticultural Society, that he had long been in the practice of turning sheep into his apple orchards, and as long as they have green pasture they will not touch the bark of the trees, but they are carefully watched. He has one old sheep only that knows how good apple bark is. When there is snow on the ground, the sheep will of course eat the bark. But the only time when the presence of the sheep is needed is in summer when the wormy fruit is dropping. We know a farmer in Western New-York who turns his sheep into his large orchard during the day, and into another field at night; they never touch the trees, and he finds the codling moth growing scarcer each successive year.

KEEPING APPLES.—At the West Grove (Pa.) Farmers' Club, T. M. Harvey and Dr. Bush both stated that they had been very successful in keeping apples packed in barrels with dry forest leaves, placing them in apartments just above freezing. Others had succeeded by packing them in sawdust, dry tan and plaster of Paris. It will be observed that all these modes not only protect the fruit from freezing when any cold snap occurs, but prevent the active currents of air, for it is not only important to keep the fruit cool, but to preserve a perfectly uniform temperature. We have found that merely wrapping the specimens in tissue paper, when kept on shelves, preserved them longer than when exposed, for the same reason—and hence also the advantage of heading up in barrels so long as fermentation and the bad effects of confined air are prevented by a cool temperature and not confining them too long.

PACKING FRUIT FOR LONG JOURNEYS.—The Garden gives the following method by which Mr. Carson, President of the Horticultural Society of Victoria, sent fresh apples and pears to the Vienna Exhibition. Each fruit was carefully wrapped in smooth, fresh tissue paper, and a layer of cotton having been put in the bottom of the box or case, a layer of fruit was then placed upon it. Cotton was rammed between the specimens and next to the sides of the box, and another layer added, and so on until the box was filled. The lid was then nailed on and the package was ready for shipment. When unpacked at Vienna, we are told that the fine appearance of the fruit excited "admiration and astonishment." We have received fruit in perfect order after a journey of thousands of miles, similarly packed, except that fine chaff or soft bran was used instead of cotton. It was, of course, essential to select such specimens as would keep sound long enough for the transit.

BLIND EXPERIMENTS.—A correspondent of the Iowa Homestead has tried some experiments with leached wood ashes applied to apple trees. Large trees had not borne, and heaps of stones and ashes were placed around them—three barrow loads of leached ashes to each tree. The next year they bore well. The experiment was then extended, and a peck of un-

leached ashes was placed around young and newly set pear, apple and plum trees, resulting in killing every one. This result appears to be easily explained. Leached ashes vary much in strength, but often have only a fifth of the potash contained in unleached. Again, when quite fresh, ashes are more caustic than after keeping a year, and a half peck of the former may do more injury than half a bushel of the latter. Again, old apple trees have thick bark, not easily destroyed by caustic ashes, while young trees have soft and thin bark, very sensitive to anything of the kind. It appears likewise that the ashes were heaped around the tree; had they been spread broadcast, they would probably have been beneficial instead of hurtful. A little calculation will show the difference in the quantity needed for large and small trees. A tree twenty feet high has roots twenty feet long at least, in every direction, covering an area forty feet in diameter. A newly set tree may not have roots more than three feet long, covering an area not exceeding six feet in diameter; the roots of the large trees cover forty-four times as great a surface as the small ones; and while one quart of ashes, spread over the six feet circle (not by any means heaped against the stem,) would be enough for the small tree, forty-four quarts, or one and a third bushels would not be a correspondingly larger application. In applying ashes, therefore, observe—1st, the freshness of the ashes; 2d, the size of the tree; 3d, vary with its condition, whether leached or unleached; and 4th, spread it broadcast.

Soil for Pears.—E. Manning of Harrisburgh, Ohio, writes to the Gardeners' Monthly on this subject, from which we glean the following statements: Beurre Clairgeau was unthrifty on a rich soil; on high, thin soil it was thrifty and excellent. Anjou succeeded well on rich soil, and failed on thin soil. Doyenne du Comice did best on thin soil; Golden Beurre of Bilboa just the reverse. These results were all on his own ground; in other regions they might have been different.

Double Working—Of pears on quince is performed at one operation by grafting the "refractory" sort the previous year on some free grower, as for example, the Bartlett on the Louise Bonne of Jersey, and then making a single graft of this new union, so that the Louise Bonne is set on the quince with the adhering Bartlett above. The double working is thus effected at one operation, and the special advantage of this mode, as we suppose, is that a large number of these prepared double grafts may be raised on a single tree of the Louise Bonne the previous year, and thus save time.

Raising Standard Pears.—M. B. Bateham informs the Prairie Farmer he never saw finer standard nursery pear trees than at Hanford's nursery at Columbus, Ohio—and was told that the four requisites for success were these: 1. A good strong loamy soil, not wet, and not before used for nursery trees; 2. Deep plowing and subsoiling, and enriching with old manure; 3. Planting only the best imported stocks, without regard to cost; and 4. Good cultivation and general care.

Succession of Pears.—J. Powell of Dayton, Ohio, gave the Horticultural Society there the following list of pears for succession, which we think will be generally approved: Earliest, (ripening there July 1st,) Doyenne d'Ete; two weeks later, Rostiezer; then Tyson; next Clapp's Favorite; after this, Bartlett, Flemish Beauty, (a "grand fruit for that region,") Onondaga, Howell, Anjou, Lawrence, Mount Vernon, Doyenne d'Alencon and Easter Beurre.

Ripening Pears.—Josiah Hoopes furnishes some excellent directions on picking and ripening pears. After alluding to the common test of ripeness for picking, namely, gently raising the fruit to see if it will readily detach itself at the stem, he directs that the specimens be placed thinly and evenly on the floor of a cool room, on a blanket previously spread, and then covered with a second blanket. He says, "In a short time the effect of the treatment will be apparent in the most golden colored Bartletts, and rich, ruddy-looking Seckels, imaginable. Pears perfected in this manner rarely have the mealiness of their naturally ripened companions; nor do they prematurely decay at the core as when left on the tree."

Winter Pears.—Where these have been stored in a cool out-house for temporary keeping, allow them to remain there as long as they will be safe from freezing; and it is better to cover them with a few clean bundles of straw, or other protection, should a sudden brief frost occur, than to take them too soon into the warm fruit cellar. Wait till the cold is likely to continue, and then the fruit cellar may be easily kept at a low temperature by means of the ventilating windows. By a little care of this kind, such early winter sorts as the Anjou, Winter Nelis and Lawrence may be easily had at midwinter, when without it they might all be gone by the first of December.

Packing Fruit for Market.—A fruit raiser in Western New-York obtains, as an average, about one dollar more for his half-barrel packages of assorted pears, sent to the New-York market, than his neighbor, who sends equally good pears. What is the cause of the difference? Simply that the first mentioned lined all his half-barrels with large, smooth sheets of white printing paper; the other said it did no good and he did not want the trouble. The paper, however, gave the packages when opened a much handsomer appearance, was some protection against bruising, and the man who was willing to take this trouble probably put up his pears better in other respects. He remarked, "I buy the best selected paper by the ream, and I think it nets me fifty cents on every cent expended for it." A North Carolina marketer of peaches writes to the Fruit Recorder that he gets the "topmost" New-York prices, by picking carefully, packing in handsome crates made of best dressed stuff, with a handsome label marked, "Peaches, No. —, grown by Limeback Bros., Salem, N. C.," which not only gives the package a neat appearance, but shows the purchaser that the grower is not afraid to endorse them. "This," he says, "is what makes them bring the figures." Another correspondent of the same paper

says that when strawberries sold for four cents per quart in Philadelphia, he sold none under fifteen cents. The cheap ones came from the South, were small, half sour, and in dirty boxes. His were selected, "nice and bright," extra size, and neatly put up.

FRUIT IN MINNESOTA.—The Minnesota Horticultural Society agree that the only apples to be generally recommended for that region of cold winters, are Tetofsky, Wealthy and Stewart's Sweet. Of plums, only the varieties of the wild sort. Grapes—Concord, Delaware, Creveling, Martha and Salem. These, of course, would need some winter protection.

LEAVES AND EVERGREEN BRANCHES.—There are many plants which will be the better for a slight covering, to be applied by the time winter fairly sets in, and it is well to secure an abundant supply in time. Rake up leaves in the dooryard and secure them; draw large wagon loads from the woods, where they may be easily had from the heaps where they have drifted, in hollows and sheltered places. If not all wanted for the garden, they will be excellent for the stable. If you have evergreen trees planted on your grounds, you will find many places where they will be improved in form by occasional shortening in, and these trimmings are just what you want for covering tender ornamentals, or for a thin protection to strawberry beds, or for tender grapes or raspberries.

WASHES FOR FRUIT TREES.—B. Morris of Trimble County, Ky., who has several thousand trees, writes to the Rural New-Yorker that thorough plowing or cultivating is the best wash that can be applied to promote growth and prevent moss on the bark—which will not accumulate on thrifty trees. He finds, as many others have found before him, that frequent cultivating during summer will make trees grow finely, even on soil that will not give large crops of corn or potatoes.

MICE AND RABBITS.—Where these animals exist, they will be pretty sure to do more or less damage in winter by gnawing the bark. The cleaner the cultivation of the ground, the less the danger from mice. If a small mound has not been thrown up around young trees before freezing up, (which is a very perfect protection if well performed,) then it will be best, after a fresh fall of snow, to tread it compactly about the bottom of the stems. The mice will not dig through the hard trodden snow. It should be repeated with new snowfalls. Rabbits are kept away by blood or rancid grease. Rub the skin of an old piece of pork, or a piece of fresh liver, on the bark two and a half feet up from the ground, and their appetite for the anointed bark is spoiled. Blood is apt to be washed off by winter rains, and the application needs repeating; or the blood should be mixed with clay, which will prevent washing off. Another way to exclude both mice and rabbits is to case the foot of the tree with sheathing paper, cording it on, or nailing it on with tacks. A few slits made in the bottom edge will enable it to spread a little, where it should be sunk slightly into the soil. For rabbits it should be thirty inches high.

"It is useful to place a few shocks of unhusked corn on each acre of the

orchard," remarks a correspondent of the COUNTRY GENTLEMAN; "all the rabbits want is enough to satisfy their appetite, and they prefer corn to apple tree bark. Lard and sulphur rubbed on the bark of trees is a good preventive, and does no damage to the trees. Snares can easily be set in the run-ways, and the rabbits destroyed. Sweet apples, cut into in the middle, stuck upon a stick and raised about six inches from the ground, with strychnine pricked into the edges, will be eaten by the rabbits at night, and you will find them dead in the morning. I do not recommend putting out poison while other remedies prove effectual."

CODLING MOTH.—Mr. Ohmer spoke at a meeting of the Horticultural Society at Dayton, Ohio, of a fine orchard of trees which he had seen that for three or four years had no fruit of any value. The owner then adopted the practice of turning in his sheep and swine, and after that had fine crops.

A SMALL AND CHEAP GRAPERY.—S. Frost of Middlesex County, Mass., furnishes the COUNTRY GENTLEMAN with the following account of his success with a small and cheap cold grapery:

Fig. 158 represents the vinery complete. 1, ventilators or openings in the base; 2, blocks of 2 by 3 inch joist, 12 inches long. The ventilators are of the same size, and alternate with these blocks around the entire structure. This base is made by nailing boards three inches wide and one inch thick upon the opposite sides of the blocks. (These are more plainly shown in fig. 159.) 7, ends of cross strips nailed from one base to its opposite, to keep the sash from spreading at the bottom. Fig. 159 shows the construction of the bases more clearly, and the manner of joining the corners. Fig. 160 shows the end sash, (without the mullions,) with the four pins which fit into corresponding holes in the top sash, serving to keep the end firmly in its place. The cost is as follows:

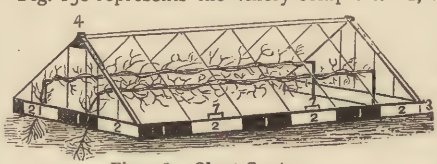


Fig. 158.—*Cheap Grapery.*

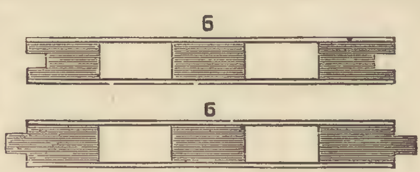


Fig. 159.

Fig. 160.

Two side sash, 3 by 6 feet, at $2.50,	$5.00
Two end sash, at $1,	2.00
Frame and making,	50
Total,	$7.50

I have grown in one 6 feet long by 4 feet wide, and ripened perfectly,

7 lbs. Lady Downs and 8 lbs. 10 oz. Black Hamburgh grapes, making 15 lbs. 10 oz. in all. The first year I grew a cane each, which ripened the wood well. The second year I cut a little over 5 lbs., mostly Hamburghs, as the Lady Downs did not do as well. The third year I cut 15 lbs. 10 oz. from the two vines. The care of it is *very* small, not over two hours for the season—putting up in the spring, pinching in two or three times, and thinning the bunches. On the 6 feet of Hamburgh vine twenty-three bunches set, but more than half were taken off. The ventilation is never changed; yet I never had any mildew, nor was troubled at all by insects. In planting the vines I trenched the ground—manuring with old, well rotted manure—a space at one end (the south—they run north and south) four feet wide and six feet long. When the vines are well ripened in the fall, about the middle of November, I prune them, leave them for a week to dry, take away the vinery, pack it away for the winter, lay the vines on the ground, and put over four inches of earth and about six inches of strawy manure. The roots, as will be seen, are entirely outside, and it never had a drop of water put in it. Considering the small expense and the long time the vinery will last if taken care of, and the superior quality of the fruit, it strikes me qnite favorably for our latitude, where we do not get our grapes well ripened oftener than once in three years.

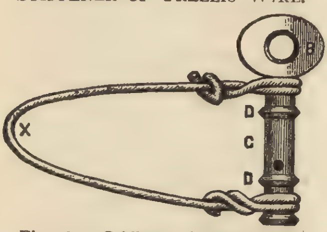


Fig. 161.—*Stiffener of Trellis Wire.*

STIFFENER OF TRELLIS WIRE.—The contrivance shown in figs. 161, 162 and 163, has been adopted in France for its simplicity. It consists of a small iron bolt with a flat head. The hole B in the flat head is used for winding up the bolt by means of a nail or any round piece of iron. The hole at C is for introducing the end of the wire to be wound up, which coils away between the flanges D D. The bolt revolves between the coils of the stirrup-shaped wire loop X, which is itself fastened by a wire to the end post or hook of the espaliers. The whole affair, with the wire loop ready mounted, is sold for three half-pence each (15 centimes.)

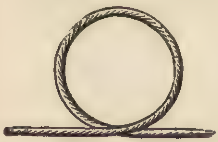


Fig. 162.

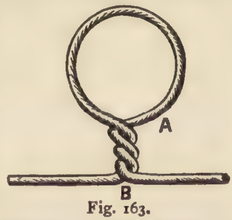


Fig. 163.

Before this mode was adopted, the tightening was effected by making a round loop, as in fig. 162, and twisting it around a round iron bolt or rod, giving the bolt as many turns as necessary, as in fig. 163. If the wire was long, several loops were made. If the wire ever gave way, it was always at A, and not at B, leaving the wire still good, an important advantage.

GRAPE TRELLIS.—A correspondent of the Fruit Recorder makes a wire trellis with a contrivance for compensating for the expansion and contraction from changes of the weather, by simply attaching a spiral spring to the wires, which requires no attention or adjusting, but always regulates itself We do not see why this spiral spring may not be made of the trellis wire, as shown in fig. 164, the only care required being to make the coils short enough to give them stiffness, and sufficiently numerous to allow considerable expansion or stretching.

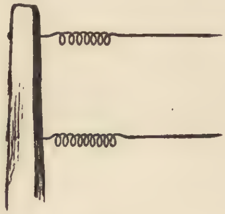


Fig. 164.

TRAINING GRAPES ON STAKES.—A correspondent trains his grapes to stakes, without the trouble of tying, by the following method:

Wire staples are driven in the stake about two inches from the top, and on opposite sides —one staple for each cane. The staple must be large enough to admit the end of the cane, and also a little wedge, formed from grape-wood trimmings. My plan is to first twist the cane around the stake, cut it off about three inches above the staple, then bend the end back carefully and insert it in the staple, put in the wedge on the outer side of the cane, give it a tap with a tack hammer, and the work is done. Of course it is understood that the canes are to be renewed yearly, as they should be to get the best results.


Fig. 165.

KEEPING GRAPES.—A correspondent of the Rural Press keeps grapes fresh and in good condition till April, in substance as follows: Gather carefully, handle little, break none, and then pack very carefully in alternate layers, with clean, dry, wheat chaff, not over three layers to a box; close the lid and keep in a dry apartment, where the grapes may be as cool as practicable without freezing. The dry chaff absorbs all moisture, aud imparts no bad flavor. We have been as successful with baked sawdust similarly used, but oak or pine will not answer—sugar maple is good; but basswood, being light and soft, is one of the best kinds of wood for the sawdust.

STRAWBERRIES—TRANSPLANTING BY BLOCKS.—We have adopted a mode by which strawberries may be set out successfully quite late in autumn, or the following spring, so as to give a fair crop at once. We have set them out during open weather at the middle of January, and had a fine dish of ripe berries in June following, from a short row. At another

time we had good berries six weeks after transplanting late in spring. The bed from which the plants are taken must be one matted with plants. It consists in taking up square blocks of earth, each with a mass of plants, and setting them in the new beds with all the earth, without disturbing the roots. First prepare the new ground by thorough mellowing. Stretch a line for each row, and then beside this line cut square holes nearly a foot across and six inches deep, at regular distances, say two feet apart. Then with a spade cut out a square block of earth with its superincumbent mass of strawberry plants, and lift it out with the spade, as shown in fig. 166. In order to make the earth adhere together and to the roots, press the earth with the spade towards the plants on the four sides when the block is cut. The soil should also be moist enough to promote adhesion together, for which reason the operation generally succeeds best soon after a rain. The larger the mass, the less the roots of the plants will be cut, and the better will be the success, but the plants will do quite well if the blocks are ten inches square, and five or six inches thick. Newly rooted runners are better than older plants, because their roots are not commonly more than six or seven inches long, and are taken up nearly entire; but older plants have roots a foot or two in length, and cannot be taken up without much cutting. Fig. 167 shows the appearance of a portion of the bed after setting out. The rows may be 2½ or 3 feet apart.

Fig. 166.

Fig. 167.

A bed of this kind may be formed at any time before the ground freezes up in the fall; or at any time before blossoming in spring; the earlier the better. It will save labor to have it as near the bed of plants as practicable.

Strawberry Beds.—Newly set strawberry beds should be scrupulously kept clean, and the runners cut off, so that the plants may form large and vigorous stools. If the rooting of runners is permitted, the plants will be seriously exhausted.

Soils for Strawberries.—Dr. Hexamer gives the New-York Tribune a list of sorts for light and heavy soils, and names Downer and Green Prolific as suited to both, but affording their best results on light soils, and

will grow in beds or matted rows. Triomphe de Gand and Jucunda will do well only on heavy soils, and kept scrupulously in hills. Nicanor, Seth Boyden and Kentucky, are best on medium loams; but for every kind of soil, Wilson and Charles Downing are best adapted—the first for market, the last for home use.

VARIETIES OF STRAWBERRIES.—Mr. Fuller recommends the Wilson, Charles Downing, and Green Prolific as the three sorts most likely to succeed over a wide range of country; and for large size, Seth Boyden, Triomphe de Gand and Jucunda, and says he never saw but one really bad strawberry—the Hautbois.

STRAWBERRIES SOUTH.—A Louisiana correspondent furnishes the Prairie Farmer with some good practical notes on strawberries, and among other things says that Russell's Prolific is doubtless the most productive berry grown, with large, high-flavored fruit, but it has generally proved a failure from a want of knowledge of its late blooming, requiring planting near some late blooming staminate, like the Kentucky. For general marketing, however, the Wilson stands at the head of the list. President Wilder and Charles Downing give promise as excellent varieties. The same writer makes the very true remark, as a reason why many have been unsuccessful there, (which will apply to all latitudes,) that "no *careless* man can grow strawberries or market them successfully."

SMALL FRUITS.—J. B. Jones gives briefly the results of his experience in raising strawberries and raspberries, in the COUNTRY GENTLEMAN:

"I prepared a field for strawberries and raspberries last season by summer-fallowing—to kill weeds and reduce to a fine tilth *only*, not believing that a rest or a fallow imparts or restores fertility. I also manured heavily, and twice cross-plowed, and now any one can see that one acre thus prepared will yield as much as three under usual cultivation. With us the Blackcaps are the main reliance, and with the ordinary care of a crop of corn, will net $75 per acre above the cost of growing a crop of corn or potatoes. Most people make the mistake of allowing the canes of Blackcaps to get too long before pruning, and then either cut off to the desired height, thus wasting vitality, and almost ruining the plants. or they do not cut at all, and allow the wind to sway and break the best canes. They should always be stopped at two feet, early in the season, and the laterals be again stopped at ten inches; and again, if they grow strong, thus giving a round, compact head, and great fruiting surface."

BERRIES FOR FIVE ACRES.—The Rural Home plants five acres, near Rochester, as follows: One acre of Blackcap raspberries; two acres with strawberries and red raspberries, on land good for sixty bushels of corn per acre; one acre to blackberries; half an acre of grapes, and half an acre to gooseberries and currants. These, of course, are for the city markets.

PLANTING AND PRESERVING CELERY.

THE FOLLOWING IS THE PROCESS which we have adopted for keeping celery, by which it is well preserved and accessible at any time in winter, but especially towards spring. It is set out early in summer in shallow trenches, one spit in depth, the object of which is to afford a rich bed to start the young plants, and to allow a slight hilling of earth in autumn, to put the plants into good shape for removal, by compressing the stalks together. Fig. 168 is a cross section of the trench, showing the slight earthing up, and the enriched earth (by the darker color) in the trench below.

Late in autumn they are taken up for their winter quarters. A dry, sheltered place is selected for this purpose, where water cannot stand in the subsoil, and where the covering of leaves will not be so likely to be blown off. We have, fortunately, a low place, where there is a natural bottom drainage of seamy rocks a foot or two below. The advantage of the low place is that the depression in the surface protects the covering from wind, the earth does not freeze so deep, and the snow drifting in serves as an additional protection. But any spot, nearly or quite as good, might be selected under the shelter of evergreens, with a tile for drainage if necessary.

Fig. 168.

Fig. 169.

A narrow trench is first dug, with a depth just equal to the whole length of the celery plants. It should not be much wider than the spade, so that the plants may be in near contact with the earth walls, and receive their protection and moisture. A day is selected for the removal of the plants when their stalks and leaves are dry or free from water. They are taken up carefully with the roots, and without a great deal of earth adhering, as the plants will get nearly moisture enough from the earth at the sides. They are closely and compactly, without bruising, placed upright in the trench, roots downward, and when the trench is filled the earth is carefully pressed against the sides at the top, leaving a small portion of the upper leaves uncovered, (fig. 169.) A thin protection of leaves, according to their need, is then placed upon them.

Those intended for the early part or middle of winter may be taken up

early in November, and being entirely excluded from light, will be well blanched by the time they are wanted ; but those for late winter and spring may remain till the middle or latter part of November before trenching, or as late as freedom from the danger of hard frosts will permit. The plants will endure a moderate freeze without injury, provided they are not disturbed till they have thawed.

The plants which are trenched early in November need only a thin covering of leaves until December cold arrives, when the covering is increased, and, as colder weather advances, it is added to until nearly a foot thick. The leaves are prevented from blowing off by a very slight covering of brush, if the locality is low or sheltered by evergreen trees. In more exposed places, they may be held on by double rows of short evergreen branches, set on opposite sides like the roof of a house, (fig. 170,) or by a wide board placed on edge on each side. The tips of the evergreens should be placed downward, to throw off the rain like a thatch.

Fig. 170.

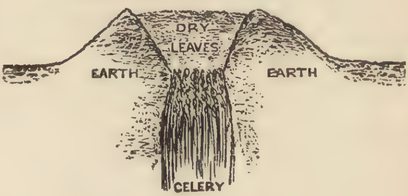


Fig. 171.

If danger is apprehended from mice, the spot selected should be in a cultivated and clean piece of ground, and a smooth, clean bank of fresh earth raised all around the trench, which will prevent the ingress of these animals, which will not burrow under snow up an ascending surface of smooth beaten earth. The embankment thus made will serve also to hold the leaves—(fig. 171.) It will be seen that the celery may be readily got at on any day in winter, by merely lifting the loose leaves.

WINTERING LETTUCE.—J. B. Root of Rockford, Ill., sows lettuce in a well drained, sheltered spot early in September, in rows 2 feet apart, with plants 3 to 6 inches in the row, and gives good cultivation, so that the plants are nearly ready to head by winter. As soon as the surface freezes, they are covered with six inches of stalks, straw and coarse litter, which is removed early in spring. The plants are commonly killed at the tops, and a few are all dead, but those that remain furnish good heads in three or four weeks.